PB-229 455

PROCEEDINGS OF THE FLORIDA PUBLIC MEETING, HELD AT ORLANDO, FLORIDA, ON MARCH 12, 1968. VOLUME 3

Federal Water Pollution Control Administration
Atlanta, Georgia

1968

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CLEAN WATER

....FOR THE NATION'S ESTUARIES

PROCEEDINGS OF THE
FLORIDA PUBLIC MEETING
ORLANDO, FLORIDA
MARCH 12, 1968

MARCH 3, 1849

VOLUME 3 of 3

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Florida Audubon Society-Sanctuary Committee
Martin R. Northrup, Co-Chairman

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   Mrs. Harry Bingham, Conservation Chairman

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   Earle M. Rader, Consulting Engineer

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   Mrs. Mary Dunlap, Executive Director

List of Registrants

NATIONAL OCEANOGRAPHIC DATA CENTER
WASHINGTON, D. C. 20390

Code 2001/jcs
March 21, 1968

Mr. John R. Thoman
Director, Southeast Region
Federal Water Pollution Control Administration
1421 Peachtree Street, N. W.
Atlanta, Georgia 30309

Dear Mr. Thoman:

A copy of your letter forwarding the general procedures for the National Estuarine Pollution Study meeting held in Orlando on March 12 and 13 has just been received from Mr. Theodore Ford, Chairman of the Estuarine Technical Coordinating Committee (ETCC) of the Gulf States Marine Fisheries Commission.

In view of the fact that item 7 of the procedures allows 15 calendar days for supplemental statements to be provided and since representatives of this activity did not attend, I am submitting herewith a statement regarding the views of our activity on the need for an estuarine and nearshore environmental data collection. I think the statement shows evidence of significant progress in the development of a suitable automated data system for processing, retention, and servicing of Gulf Coast marine environmental data and information. It is a cooperative effort in which the ETCC has played a major role.

This is the first major geographical area of the U. S. for which a data system has been devised. It is our hope and expectation that the Gulf of Mexico Estuarine Inventory system will serve as a model for other regions and as a basic data common denominator for all laboratories working along the Gulf Coast to use; it should expedite processing of observations and make data summaries, correlations, etc., more readily available for expeditious analysis by computer or other means. Of course the long-term retention of the information as a historic archive is an important supplemental benefit.

Sincerely yours,

H. W. DUBACH
Deputy Director

Enclosure

STATEMENT ON GULF OF MEXICO ESTUARINE INVENTORY FOR INCLUSION IN NATIONAL ESTUARINE STUDY

The Gulf States Marine Fisheries Commission's (GSMFC) concern over environmental changes in the nearshore and estuarine waters of the Gulf of Mexico brought a recognition of the critical need for a data base containing historic and contemporary environmental information of the Gulf of Mexico. This need has evolved into the "Gulf of Mexico Estuarine Inventory" (GMEI) project which has the following stated goals:

(1) To methodically accession the environmental data from the Gulf of Mexico and enter these data in an archiving standard.

(2) To organize, systematize, and scientifically review marine environmental data collected by and of interest to the Gulf laboratories and make these data rapidly and inexpensively accessible to the Gulf laboratories and GMEI participants in a form amenable for their future analyses and requirements.

(3) To provide to interested parties marine environmental data in a convenient form for computer manipulation.

This is a planned, systematic, cooperative effort by participants of the GSMFC and the marine laboratories working along the Gulf Coast to consolidate into a single common archive information for use in research studies; to establish the basic "climatic" regime; to discover both short and long term temporal changes in the environment; to determine cause and effect interrelationships of changes in the inshore ecology; etc.

Development of a computer usable data base is essential if existing information is to receive maximum utilization by the researcher, the environmentalist, the fishery industry, the conservation specialist, and the economist. Automated assistance promises the best opportunity to derive research results in the shortest time span that will provide a more complete understanding of the marine environment and its interrelationships with living creatures, and to correct man-produced contemporary changes in the ecological balance that may have long term and devastating effects on marine life and resources. For these reasons, the GSMFC Estuarine Technical Coordinating Commission and the National Oceanographic Data Center (NODC), by common agreement, have developed a single data system for making Gulf of Mexico marine data amenable for computer handling. This will be a continuing file of information. It will serve as a model for design of data systems to serve other geographic regions; the data base will be available for use by any investigators or laboratories from the NODC.

DANTE B. FASCELL
12TH DISTRICT, FLORIDA

COMMITTEES:
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CHAIRMAN: LEGAL AND MONETARY AFFAIRS SUBCOMMITTEE
MEMBER: GOVERNMENT ACTIVITIES SUBCOMMITTEE
FOREIGN AFFAIRS
CHAIRMAN: INTERNATIONAL ORGANIZATIONS AND MOVEMENTS SUBCOMMITTEE
MEMBER: INTER-AMERICAN AFFAIRS SUBCOMMITTEE

JOHN R. BUCKLEY
ADMINISTRATIVE ASSISTANT

Congreſs of the United States
House of Representatives
Washington, D.C. 20515

March 8, 1968

Mr. Eugene T. Jensen
Chief, Office of Estuarine
Studies
Federal Water Pollution Control
Administration
Department of the Interior
Washington, D. C.

Dear Mr. Jensen:

Many thanks for your letter advising me of the meeting of the Federal Water Pollution Control Administration and officials of the State of Florida next week to discuss estuarine preservation and development problems. I appreciate your thoughtfulness in including me in your plans, but unfortunately, since both the 12th and 13th of March will be full legislative days I will not be able to join you.

The study of our national estuarine areas is a most important area in our national conservation efforts, and as you know, I strongly supported legislation recently passed by the House of Representatives, H.R. 25, authorizing preservation efforts.

I am sure your meeting with Florida officials will be a most informative and productive one for Florida, and regret that I will not be able to participate.

Again, thank you for your interest.

Sincerely,

Dante B. Fascell

DANTE B. FASCELL
Member of Congress

DBF:E

JAMES A. HALEY
7TH DIST., FLORIDA

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ROOM 1236 LONGWORTH BUILDING

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ADMINISTRATION

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House of Representatives
Washington, D.C. 20515

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MISS ALICE MYERS
PALMETTO, FLORIDA

MRS. MARILEE B. MACNICHOL
RIVERVIEW, FLORIDA

DISTRICT OFFICE:
BARTOW, FLORIDA
R. ELMO HOOD

March 4, 1968

Mr. Eugene T. Jensen, Chief
Office of Estuarine Studies
Federal Water Pollution Control Administration
Washington, D. C. 20242

Dear Mr. Jensen:

Thank you very much for your recent letter calling my attention to the meeting to be held in Orlando on March 12 and 13 as a part of the Federal Water Pollution Control Administration's national estuarine study.

I regret sincerely that I will be unable to attend the meeting or that it will be possible for me to have a representative there.

I would appreciate it if the occasion arises if you could express my interest in this program to those attending the meeting. I would appreciate also being furnished a copy of the proceedings when the transcript is available.

With good wishes, I am

Sincerely yours,

James A. Haley

JAMES A. HALEY
Congressman, 7th District
Florida

JAH:ams

PAUL G. ROGERS
Florida
ROOM 2417, RAYBURN BUILDING

HOME ADDRESS
West Palm Beach, Florida

ADMINISTRATIVE ASSISTANT
ROBERT B. LOCHRIE, JR.

Congress of the United States
House of Representatives
Washington, D.C.

COMMITTEES:
INTERSTATE AND FOREIGN COMMERCE
MERCHANT MARINE AND FISHERIES

SUBCOMMITTEES:
Public Health
Investigations
Merchant Marine
Oceanography
Coast Guard
Fish and Wildlife

March 13, 1968

Mr. Eugene T. Jensen
Chief, Office of Estuarine Studies
Federal Water Pollution Control Administration
DEPARTMENT OF THE INTERIOR
Washington, D. C.

File: Mtg-3/12-13

Dear Mr. Jensen:

Thank you for your letter of February 26th informing me of the meeting in Orlando, Florida on March 12th and 13th to discuss estaurine preservation and development problems.

Unfortunately, I will not be able to attend the meeting nor be represented there, but I certainly support this effort of the Federal Water Pollution Control Administration to give the interested citizens of Florida an opportunity to voice their opinion on estaurine problems. I would appreciate having a copy of the transcript of the proceedings when available.

Kind regards and all good wishes.

Sincerely yours,

PAUL G. ROGERS, M. C.

PGR/bb

ESTUARINE MANAGEMENT

Although I have not become familiar with various federal programs dealing with pollution of estuarine areas I have given considerable attention to the problems of pollution of the Indian River in the central east coastal area of the state.

As you know, the Indian River is not a river, but a bay, separated from the ocean by a series of islands. As a system, it extends from Volusia County on the north, to Martin County on the south. There are five natural inlets, and one man-made inlet at Port Canaveral.

To a greater or lesser degree, the Indian River has suffered from pollution primarily from sewage and agricultural sources.

The river system is, I believe, one of the greatest untapped natural resources of the area. It offers potential for shellfish production to the extent that a large industry could be supported by the river system; it offers unparalleled sport fishing, a great adjunct to our tourist industry; it offers great opportunity for water sport of all sorts, also important to our tourist industry; and perhaps most important, it is a breeding ground for a vast variety of marine species, both estuarine and off-shore.

Since my district covers only Brevard and Indian River counties, I have been directly concerned over the last year with attacking the problem of pollution in those counties. However, since the river system does not end with any county line, the problem of pollution control and the larger opportunity for the management of this natural resource must be approached on a regional basis. There can be no other approach which will be successful in the long run. Attempts have been made in the past year by the legislature and the administration to create the structure in law to begin an approach to pollution control on a state-wide basis. To a lesser extent but of equal significance, we have made a beginning on a two-county basis toward the actual management of the river system, primarily to stimulate an expansion of the shellfish industry in the area.

On a state level we have created, in essence, a pollution control agency. By local act in Brevard County and with the concurrence of the County Commission we have enacted a strict septic tank law, and provided that the county may build a county-wide sewerage disposal system.

We have also provided by law an establishment of a county-wide solid waste disposal system which may have some small bearing on river pollution.

From the management aspect, we established by law a shellfish management district in Indian River and Brevard counties, The State Department of Conservation. The department created, by regulation, a shellfish management district advisory commission. The department is charged with regulating shellfish production (although this must be done in cooperation with state department of health and local county health officers) and the advisory commission made up of representatives of shellfish industries, health authorities, and representatives of the public, is charged with recommending not only regulatory measures, but promotional measures designed to assist in the development of the industry, for implementation by the Department of Conservation and by the State Department of Health. Florida Institute of Technology, a private institution, is assisting in technical phases of this effort. Preliminary discussions have been held between myself, Representative William Gillespie, of Volusia County, and Representative Charles Nergard, of St. Lucie County, relative to extending the management district to cover these counties.

It is my belief that the most efficient and effective way to approach the problem of pollution and utilization of a given estuarine system is with a total overall management approach. The monitoring and overall control on an inter-county basis of pollution, the regulation of fisheries and shellfish production, and the promotion of properly conceived exploitation of the natural resources offered by an estuarine system should, I believe, be undertaken by one agency. This agency must, of course, cooperate with the state, the counties, the federal government and municipalities. Representatives of these governmental bodies should be included in the governing body of the single agency but industry, agriculture and other interested groups should also be represented.

Estuarine Management

The authority of the agency should be established and defined in fairly specific terms by act of the legislature. The functions of the agency should be to conduct studies of the estuarine system, to recommend legislation or executive action, and the agency should have a considerable amount of regulatory power in its own right.

The agency should probably have the power to levy a limited tax, either ad valorem or a levy on seafood products, to provide for staffing and office expense. Enforcement could be provided by agents of the Department of Conservation and Department of Health.

One of the primary functions of the agency might be to act as a funnel or transmission belt through which state and federal regulations could be transmitted. It could afford a single regulatory source and a single source of information for individuals and governmental subdivisions and agencies alike.

This in no way should imply federal control over a state or inter-county agency. In fact, my preference would be that any federal funds which might be made available to such an agency be made available on a block grant basis.

Charles E. Davis, Jr.
Member - House of Representatives

Statement by SENATOR HENRY SAYLER of St. Petersburg, Florida, for presentation to the FEDERAL WATER POLLUTION CONTROL ADMINISTRATION (Department of the Interior), at their meeting in Orlando on March 12 and 13, 1968.

It has become painfully apparent to the majority of the citizens of the United States that the continuing pollution of our esturaries has, indeed, become a serious national problem affecting the health and welfare of millions of people. Over a period of many years, government, industry, public utilities, the Armed Forces and private citizens have, without foresight, polluted vast areas of our nation's waterways.

Recognizing the overriding need for action, the Florida legislature enacted, in 1967, a new anti-pollution law which has been acclaimed throughout the country as one of the best, if not the best, such law now on the books. Only the test of time and results will prove the true merit of this new and far-reaching law. With eight thousand miles of coastline, the longest of all of our states, Florida can be a major proving ground for anti-pollution efforts.

In Florida, our waterway problems go further than just pollution. Indiscriminate dredging and filling over the years have caused new erosion problems, disrupted tidal currents, harmed some land owners, ruined submerged bottoms, damaged the outstanding fish and shellfish industry and outdoor recreation. Substantial progress is being made in correcting these problems, but much remains to be done.

We in Florida realize that, when some states fail to accept their responsibilities, the Federal government, of necessity, must fill the void. We, however, also feel that, for the best and quickest results, a partnership between local, state and Federal governments is desirable. In the area of research, much of which is still needed, the Federal government can and should play a key role. The United States Army, Corps of Engineers, can make a greater contribution toward the common objective than they have in the past.

The greatest single deterrent toward effective action has been public apathy. Now that this apathy has turned to anger and a demand for action, we can anticipate great strides through every level of government in conquering this most serious problem.

We appreciate the Federal Water Pollution Control Administration holding this public meeting in the State of Florida.

Submitted for the record by the
Honorable Lynwood Arnold, Florida
House of Representatives, Jacksonville,
Fla.

Fr. House Reps

CHAPTER 67-393

Committee Substitute for House Bill No. 1207

AN ACT relating to submerged lands, biological surveys; amending section 253.12; providing that prior to the sale of sovereignty tidal and submerged lands by the trustees of the internal improvement trust fund, the board of conservation shall make a biological survey and ecological study; ratifying and confirming prior sale of fill material; amending sections 253.122 and 253.124, Florida Statutes, to provide a similar procedure pursuant to the setting of bulkhead lines and the granting of fill permits; providing that the trustees may approve or reject applications approved by local governing bodies; amending section 253.123 to prohibit the removal of sand, rock or earth from navigable waters and submerged lands channelward of bulkhead lines with certain exceptions; providing penalties; amending section 253.126, Florida Statutes; providing an effective date.

Be It Enacted by the Legislature of the State of Florida:

Section 1. Section 253.12, Florida Statutes, is amended to read:

253.12 Title to tidal lands vested in state.—

(1) Except submerged lands heretofore conveyed by deed or statute, and submerged lands in navigable fresh water lakes, rivers and streams, the title to all sovereignty tidal and submerged bottom lands; including all islands, sandbars, shallow banks and small islands made by the process of dredging of any channel by the United States government and similar or other islands, sandbars, and shallow banks located in the navigable waters, which shall include all coastal and intracoastal waters, of the state, is vested in the trustees of the internal improvement trust fund.

(2) The trustees of the internal improvement trust fund may sell and convey such islands and submerged lands if not determined by the trustees to be contrary to the public interest upon such prices, terms and conditions as they see fit, provided, however, that prior to consummating any such sale, they shall determine to what extent the sale of such islands or submerged lands and their ownership by private persons or the conveyance of such islands or submerged lands to political subdivisions or public agencies would interfere with the con-

servation of fish, marine and wildlife or other natural resources, including beaches and shores; and would result in destruction of oyster beds, clam beds or marine productivity, including, but not limited to, destruction of marine habitats, grass flats suitable as nursery or feeding grounds for marine life, and established marine soils suitable for producing plant growth of a type useful as nursery or feeding grounds for marine life, and if so, in what respect and to what extent, and they shall consider any other factors affecting the public interests.

(3) After receiving application in compliance with such form as they may require to show clearly what is intended to be accomplished in any proposed development of said lands and the manner in which said development will be accomplished and after making the determination required by subsection (2) hereof, they shall give notice by publication in a newspaper published in the county in which such islands or submerged lands are located not less than once a week for three (3) consecutive weeks and mailing copies of such notice by certified or registered mail to each riparian owner of upland lying within one thousand (1,000) feet of the island or submerged land proposed to be conveyed addressed to such owner as his name and address appears upon the latest county tax assessment roll, in order that any persons who have objections to the sale may have the opportunity to present the same. If no objections are filed within thirty (30) days after the date of first publication of the aforesaid notice, the trustees have authority to consummate such sale; except as hereinafter provided. Provided, however, that failure to mail the notice herein provided to such riparian upland owners within one thousand (1,000) feet or any of them shall not invalidate such sale nor the title conveyed by the trustees pursuant thereto.

(4) If objections are filed, the trustees or their designee shall hear and consider the same at a public hearing, and when determined by the trustees said hearing may be held at the county seat from whence the application to purchase has been received. If it appears that the sale of such islands and submerged lands and their ownership by private persons or the conveyance of such islands or submerged lands to political subdivisions or public agencies, would be contrary to the public interest; or would interfere with the lawful rights granted riparian owners; or would be or result in a serious impediment to navigation, or if to the extent as to be contrary to the public interest would interfere with the conservation of fish, marine

servation of fish, marine and wildlife or other natural resources, including beaches and shores; and would result in destruction of oyster beds, clam beds or marine productivity, including, but not limited to, destruction of marine habitats, grass flats suitable as nursery or feeding grounds for marine life, and established marine soils suitable for producing plant growth of a type useful as nursery or feeding grounds for marine life, and if so, in what respect and to what extent, and they shall consider any other factors affecting the public interests.

(3) After receiving application in compliance with such form as they may require to show clearly what is intended to be accomplished in any proposed development of said lands and the manner in which said development will be accomplished and after making the determination required by subsection (2) hereof, they shall give notice by publication in a newspaper published in the county in which such islands or submerged lands are located not less than once a week for three (3) consecutive weeks and mailing copies of such notice by certified or registered mail to each riparian owner of upland lying within one thousand (1,000) feet of the island or submerged land proposed to be conveyed addressed to such owner as his name and address appears upon the latest county tax assessment roll, in order that any persons who have objections to the sale may have the opportunity to present the same. If no objections are filed within thirty (30) days after the date of first publication of the aforesaid notice, the trustees have authority to consummate such sale; except as hereinafter provided. Provided, however, that failure to mail the notice herein provided to such riparian upland owners within one thousand (1,000) feet or any of them shall not invalidate such sale nor the title conveyed by the trustees pursuant thereto.

(4) If objections are filed, the trustees or their designee shall hear and consider the same at a public hearing, and when determined by the trustees said hearing may be held at the county seat from whence the application to purchase has been received. If it appears that the sale of such islands and submerged lands and their ownership by private persons or the conveyance of such islands or submerged lands to political subdivisions or public agencies, would be contrary to the public interest; or would interfere with the lawful rights granted riparian owners; or would be or result in a serious impediment to navigation, or if to the extent as to be contrary to the public interest would interfere with the conservation of fish, marine

and wildlife or other natural resources, including beaches and shores; or if to the extent as to be contrary to the public interest would result in the destruction of oyster beds, clam beds, or marine productivity, including, but not limited to, destruction of natural marine habitats, grass flats suitable as nursery or feeding grounds for marine life, and established marine soils suitable for producing plant growth of a type useful as nursery or feeding grounds for marine life, the trustees shall withdraw the said lands from sale; provided that prior to making the determinations above required the trustees may consider any other factors affecting the public interest. Anything in this section to the contrary notwithstanding, lands defined herein lying between the ordinary high water line and any bulkhead line, established hereunder shall be sold only to the upland riparian owner and to no other person, firm or corporation; and such sale to said upland riparian owner shall be made pursuant to the provisions herein.

(5) When any state agency, county, city or other political subdivision extends or adds to existing lands or islands bordering on or being in the navigable waters as defined in this section of the state by filling in or causing to be filled in or by draining or causing to be drained such waters the trustees of the internal improvement trust fund may, upon application therefore, convey to the riparian owner or owners of the upland so extended or added to so much of such extended or added land as is not required exclusively for a municipal, county, state or public purpose. The trustees may, however, require a deposit to accompany such application of a sum sufficient to cover the actual cost and expenses of processing such application and preparing instruments of conveyance.

(6) Where any person, state agency, county, city or other political subdivision prior to June 11, 1957, extended or added to existing lands or islands bordering on or being in the navigable waters as defined in this section by filling in or causing to be filled in such lands the trustees of the internal improvement trust fund shall upon application therefor convey said land so filled to the riparian owner or owners of the upland so extended or added to. The consideration for such conveyance shall be the appraised value of said lands as they existed prior to such filling .

(7) In order to assist them in making the determination required by subsection (2) hereof, the trustees shall require

that a biological survey and an ecological study of the area proposed to be sold pursuant to any particular application be made, and where determined by the state board of conservation to be necessary, a hydrographic survey be made. All such surveys and studies shall be made by or under the direction of the state board of conservation which shall make a report of all such surveys and studies to the trustees of the internal improvement trust fund together with its recommendations. The trustees may adopt regulations requiring that the cost of making any such survey and report be paid by the applicant for purchase of such lands, requiring a deposit by the applicant sufficient to insure such payment and providing procedures to be followed in applying for and obtaining such survey and report.

(8) All conveyances of sovereignty lands or fill material therein heretofore made by the trustees of the internal improvement trust fund of Florida subsequent to the enactment of chapter 6451, acts of 1913, chapter 7304, acts of 1917 and chapter 57-362, acts of 1957, as amended, are hereby ratified, confirmed and validated in all respects.

Section 2. Subsections (1), (2) and (3), of section 253.122, Florida Statutes, are amended to read:

253.122 Power to fix bulkheads.—

(1) Subject to the approval of the trustees of the internal improvement fund, who shall have the power to approve or reject, the board of county commissioners of each county or governing body of any municipality, after having obtained a biological survey, and ecological study and hydrographic survey, if required by the board of conservation, as hereinafter provided, and after making such determinations as are hereinafter provided, and after public hearing, of which at least thirty (30) days prior notice has been given by publication for three (3) consecutive weeks in a newspaper of general circulation in the county, are hereby authorized on their own initiative to locate and fix a bulkhead line or lines adjacent to or offshore from any existing lands or islands bordering on or being in the navigable waters of the county, as defined in section 253.12, Florida Statutes, within all or part of the territorial area of the county as the board of county commissioners, in its discretion may determine; provided, however, that where any bulkhead line has been located and fixed by any

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municipality pursuant to statutory authority, such bulkhead line shall be accepted and adopted by the county commissioners of the county wherein such municipality is located as its bulkhead line within the territorial area of such municipality subject to the provisions of this chapter. Any bulkhead line when so fixed or ascertained and established shall represent the line beyond which a further extension creating or filling of land or islands outward into the waters of the county shall be deemed an interference with the servitude in favor of commerce, navigation, and conservation of natural resources, with which the navigable waters of this state are inalienably impressed.

(2) Upon the written application of any reparian owner addressed either to the board of county commissioners or the governing body of any municipality wherein the land lies, the board or governing body is directed to locate and fix a bulkhead line or lines within the area and vicinity of the land owned by such applicant in the event a bulkhead line or lines has not been established by the board pursuant to subsection (1) above.

(3) Before locating or fixing any bulkhead line or lines pursuant to this section and before changing any previously established line or lines pursuant to the provisions of subsection (5) hereof, the board of county commissioners or governing body of the municipality shall determine and consider whether any extension, creation or filling of land or islands into the waters lying between the existing upland or island and such proposed bulkhead line or proposed changed bulkhead line would be contrary to the public interest; would interfere with the lawful rights granted reparian owners; would be or result in a serious impediment to navigation; would interfere with the conservation of fish, marine and wildlife or other natural resources, including beaches and shores to such an extent as to be contrary to the public interest, or would result in the destruction of oyster beds, clam beds or marine productivity, including but not limited to, destruction of natural marine habitats, grass flats suitable as nursery feeding grounds for marine life, and established marine soils suitable for producing plant growth of a type useful as nursery or feeding grounds for marine life to such an extent as to be contrary to the public interest. The board of county commissioners or other authorized governmental body shall consider and determine any other factors affecting the public interests. To assist it in mak-

ing such determination and prior to fixing or changing any such bulkhead lines, the board of county commissioners or governing body of the municipality shall, if required by the board of conservation, direct that a biological survey and an ecological study be made of the area lying between the existing upland or islands and such proposed bulkhead line or proposed changed bulkhead line, and where determined by the board of conservation to be necessary that a hydrographic survey be made by or under the supervision of the state board of conservation and shall have in hand the report and findings thereof. The board of county commissioners or governing body of the municipality shall require the applicant to pay the cost of such surveys and study.

(4) In the event the board of county commissioners or the governing body of any municipality, for a period of sixty (60) days next and after the receipt of the written application by such upland owner, fails, neglects or refuses to locate and fix a bulkhead line or lines pursuant to subsection (3) above, for the area and in the vicinity of the land of any such riparian upland owner, then and in that event such upland and riparian owner of land may file his application for the establishment of a bulkhead line with the trustees of the internal improvement trust fund, who are hereby authorized and directed to proceed to locate and fix a bulkhead line or lines within the area or vicinity of the riparian uplands of such owner and when such bulkhead line or lines shall have been located and fixed by the said trustees of the internal improvement fund, the same shall have the force and effect as though such line or lines had been located and fixed by the board of county commissioners or governing body of any municipality to whom such original application had first been made. In fixing or approving a bulkhead line or lines under the provisions of this subsection, the trustees shall follow the same procedures and requirements as are provided for the fixing of such lines in subsection (3) of this section.

Section 3. Subsections (4) and (5) of section 253.122 are renumbered as subsections (5) and (6) respectively.

Section 4. Section 253.124, Florida Statutes, is amended to read:

253.124 Application for filling land.—

(1) Any private person, firm or corporation desiring to construct islands or add to or extend existing lands or islands

located in the unincorporated area of any county bordering on or in the navigable waters of the state as defined in section 253.12, Florida Statutes, by pumping sand, rock or earth from such waters or by any other means shall make application in writing to the board of county commissioners of the county wherein such construction is desired, for a permit authorizing such person, firm or corporation to engage in such construction, provided that where it is desired to construct islands or add to or extend existing lands or islands within the territory of any municipality such application for a construction or fill permit shall be made to the governing body of such municipality.

(2) In each instance the written application herein provided for shall be accompanied by a plan or drawing showing the proposed construction and the manner in which said construction will be accomplished and shall also show the area from which any fill material is to be dredged if the proposed construction is intended to be created from dredged material. In the event such proposed extension or filling of land or such proposed dredging be found by the board of county commissioners or other authorized body, not to be violative of any statute, zoning law, ordinance, or other restrictions which may be applicable thereto, and that no harmful obstruction to or alteration of the natural flow of the navigable water as defined in section 253.12, Florida Statutes, within such area will arise from the proposed construction, and that no harmful or increased erosion, shoaling of channels or stagnant areas of water will be created thereby, and that no material injury or monetary damage to adjoining land will accrue therefrom, the same shall be granted to the applicant, subject to the approval of the trustees of the internal improvement trust fund who shall have the power to approve, reject or issue; provided however, that prior to the issuance of such permit, the board of county commissioners or other authorized body shall determine whether the granting of such permit and the construction to be done pursuant thereto would interfere with the conservation of fish, marine and wildlife or other natural resources, to such an extent as to be contrary to the public interests, and whether the destruction of oyster beds, clam beds, or marine productivity, including, but not limited to, destruction of natural marine habitats, grass flats suitable as nursery or feeding grounds for marine life, including established marine soils suitable for producing plant growth of a type useful as nursery

or feeding grounds for marine life will result therefrom to such an extent as to be contrary to the public interest. The trustees shall also consider any other factors affecting the public interests.

(3) No construction permit shall be issued or approved until the board of county commissioners or other authorized body shall have obtained, at the expense of the applicant, a biological survey and an ecological study, and where deemed necessary by the board of conservation a hydrographic survey, of the area within which such construction and dredging is proposed, each by or under the supervision of the state board of conservation and shall have in hand the report and findings thereof. Such surveys and studies may not be required if the proposed construction or dredging is wholly shoreward of a previously established bulkhead line which was fixed after consideration by the bulkhead authority of a biological survey and ecological study previously made by the state board of conservation or under its supervision in connection with the fixing of such line or if the proposed construction or dredging is wholly within lands or islands heretofore purchased from the trustees of the internal improvement trust fund under section 253.12, Florida Statutes, and in the consummation of such sale the trustees had before them a biological survey made by or under the supervision of the state board of conservation.

(4) No construction permit shall be issued unless the proposed work is to be completed within three (3) years next after the date of issuance of such permit. Such time may be extended by the trustees for good cause, upon showing that all due efforts and diligence toward completion of said work have been made. The construction permit herein provided for may be revoked by the trustees for noncompliance with or for violation of its terms after notice of intention to do so has been furnished to the holder thereof and an opportunity for a hearing has been afforded. In the event a permit is refused, the applicant therefor may have the order refusing the permit reviewed upon filing a petition for the issuance of a writ of certiorari with the appropriate circuit court in the manner and within the time prescribed by the Florida appellate rules.

(5) Any person who violates any provision of this section is guilty of a misdemeanor and upon conviction shall be fined not more than five hundred dollars ($500.00), or imprisoned not exceeding six (6) months, or both, in the discretion of the court.

(6) The trustees shall have the authority to direct the abutting upland owner to remove any fill created in violation of this section, either on behalf of itself or on behalf of itself and the state board of conservation. In the event that the abutting upland owner does not remove said fill as directed, the trustees may remove it at their own expense and the costs thereof shall become a lien upon the property of said abutting upland owner; provided that the trustees may, if they choose, allow said fill to remain as state owned land, and may employ a surveyor to determine the boundary between such state land and that of the previous abutting upland owner. The amount of the cost of such survey shall become a lien upon the property of the previous abutting upland owner. Nothing herein shall be construed to grant the trustees authority to direct an upland owner to adjust, alter or remove silt, fill or other solid material which has accumulated or been deposited seaward of his property through no action on his part.

Section 5. Section 253.123, Florida Statutes, is amended to read:

253.123 Restrictions on filling land and dredging beyond bulkhead lines.—

(1) No private person, firm or corporation shall construct islands or add to or extend existing lands or islands bordering on or being in the navigable water of the state as defined in subsection 253.12 (1) by pumping sand, rock or earth from such waters or by any other means without first complying with subsection 253.122 provided nothing herein contained shall relate to artificially created navigable waters.

(2) The removal of sand, rock or earth from the navigable waters of the state as defined in section 253.12, Florida Statutes, and the submerged bottoms thereof lying channelward of bulkhead lines duly established under the provisions of section 253.122, Florida Statutes, by dredging, pumping, digging or by any other means shall not be permitted except in the following instances:

(a) For the construction, improvement or maintenance of navigation channels and drainage and water control facilities.

(b) For the construction of trenches for the burial or installation of water, sewer, gas, oil, gasoline, fuel, electric, telegraph or telephone lines, cables or mains;

(c) For the operation of sand transfer plants, the replenishment of eroded beaches, or for the prevention or reduction of beach erosion, subject to approval by the state board of conservation; and

(d) For other purposes when, but only when, the trustees have determined, after consideration of a biological survey and an ecological study and a hydrographic survey, if such hydrographic survey is required by the board, made by or under the supervision of the state board of conservation of the area from which such sand, rock or earth is proposed to be removed that such surveys and study show that such removal will not interfere with the conservation of fish, marine and wildlife or other natural resources to such an extent as to be contrary to the public interest, and will not result in the destruction of oyster beds, clam beds, or marine productivity, including, but not limited to, destruction of natural marine habitats, grass flats suitable as nursery or feeding grounds for marine life, and established marine soils suitable for producing plant growth of a type useful as nursery or feeding grounds for marine life or natural shoreline processes to such an extent as to be contrary to the public interests.

(3) (a) Works authorized under 2(a), and 2(b) shall only be undertaken after receipt of a permit from the trustees, which permit shall be granted after consideration of a biological or ecological study unless waived by the Trustees, upon a showing of the public interest which will be served by such works.

(b) The provisions of 2(d) hereof shall not be construed to eliminate the requirement of obtaining a permit for the removal of sand, rock or earth from any part of the navigable waters of the state as defined in section 253.12, Florida Statutes, and the submerged bottoms thereof from the appropriate authority as elsewhere in this chapter or otherwise by law provided.

(4) Neither the sale and conveyance of islands and lands by the trustees of the internal improvement trust fund under the provisions of section 253.12, Florida Statutes, nor the establishment of a bulkhead line or lines by the appropriate authority under the provisions of section 253.122, Florida Statutes, nor the granting of a construction permit under the provisions of section 253.124, Florida Statutes, shall operate to

vest any right whatsoever in the grantee, upland owner or construction permit holder to remove sand, rock or earth from the navigable waters of the state as defined in section 253.12, Florida Statutes, and the submerged bottoms thereof lying channelward of bulkhead lines duly established under the provisions of section 253.122, Florida Statutes, unless a construction permit issued pursuant to the provisions of section 253.124, Florida Statutes, and of this section specifically permits such removal.

Section 6.

(1) The State Board of Conservation shall have a period of ninety (90) days, after application therefor, in which to make the studies and surveys required by this chapter.

(2) All hearings required by this chapter shall be conducted according to the Administrative Procedure Act of Florida, Parts II and III (Florida Statutes 120.20-120.28 and 120.30-120.331).

Section 7. Any section, subsection or paragraph of this act held to be invalid or unconstitutional shall in no way affect or impair any remaining section, subsection or paragraph of this act.

Section 8. Section 253.126, Florida Statutes, is amended to read:

253.126 Application to governmental units.—The limitations and restrictions imposed by this chapter upon the construction of islands or the extension or addition to existing lands or islands bordering on or being in the navigable waters as defined in section 253.12, shall apply to the state, its agencies and to all political subdivisions and governmental units. No other general or special act shall operate to grant exceptions to this section unless this section is specifically repealed thereby.

Section 9. This act and the amendments to the law occasioned thereby shall not be retroactive or retrospective and shall not be construed to be retroactive or retrospective, provided, however, that any application for action by the Trustees or other administrative proceedings pursuant to this chapter pending at the time of the effective date of this Act which have not been finally disposed of by vote of the Trustees shall be governed by the provisions of this Act.

Section 10. This act shall take effect immediately upon becoming a law.

Approved by the Governor July 14, 1967.

Filed in Office Secretary of State July 14, 1967.

FLORIDA AGRICULTURAL EXTENSION SERVICE
UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES

COLLEGE OF AGRICULTURE AGRICULTURAL EXPERIMENT STATIONS AGRICULTURAL EXTENSION SERVICE SCHOOL OF FORESTRY

REPLY TO: 21 McCarty Hall
Gainesville, Florida 32601
March 12, 1968

Director, Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control Administration
Athens, Georgia 30601

Sir:

The Institute of Food and Agricultural Sciences, University of Florida, includes the College of Agriculture, School of Forestry, Florida Agricultural Experiment Stations and the Florida Agricultural Extension Service. The Division of Biological Sciences includes, in addition, the departments of Zoology and Marine Science and coordinates the biological sciences throughout the University including the Colleges of Medicine and Engineering. All of these Sections of the University of Florida are vitally concerned with the optimum food production and growth of agricultural industries, the preservation and best use of natural resources, and the development of recreational potentials within the State. We are, therefore, concerned over the pollution or potential pollution of estuaries.

Our special research interests include:

(1) Effect of industrial wastes and the influence of different types of industrial wastes.
(2) Sewage waste disposal including detergents.
(3) Human and animal wastes.
(4) Agricultural wastes (pesticides and fertilizers).
(5) Soil and water management practices.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS STATE OF FLORIDA, COLLEGE OF AGRICULTURE, UNIVERSITY OF FLORIDA, U. S. DEPARTMENT OF AGRICULTURE AND BOARDS OF COUNTY COMMISSIONERS, COOPERATING

(6) The net economic effects of pollution control.

(7) Estuarine ecology (Microbiology and Nematology).

Staff members are conducting research in all of these areas with limited resources. In most instances research is concerned with the advantageous use or reduction of these wastes. In other instances investigations center on the ecological effects of the wastes.

Basic knowledge is woefully lacking in regard to:

(1) The amount of waste material entering specific estuaries.

(2) The changes in the estuarine environment which may result from various increments of different types of wastes individually and in combination with others.

(3) The characteristics and best use of given estuaries.

(4) The productivity of given estuaries with and without introduction of known quantities of wastes.

(5) The role of marine organisms in the removal or degradation of wastes.

(6) The potential use of wastes for controlled food production in estuarine zones.

(7) The microbiological and chemical safety of foods grown in areas of effluent sewage and then purged in clean areas.

(8) The kind and amount of pollution control which maximizes society's net returns to the control measures when all effects (both internal and external) are considered.

The Institute of Food and Agricultural Sciences and the Biological Sciences have extended capabilities to develop information and action programs with respect to estuarine pollution and the best use of these resources.

Since the widespread use of pesticidal products was begun, IFAS, especially the Departments of Entomology and Nematology, Food Science, Soils, and Agricultural Engineering, has been continuously involved in research and educational programs on their proper use. In fact, during the past six years safety in the use of agricultural chemicals has been stressed as a very important part of our Extension program. It has been so successful that Florida has been recognized as being a national leader in this effort. Particular emphasis has been placed on the problems resulting from such acts of carelessness as direct aerial spraying of open waters by planes, washing of spray equipment in lakes and streams, and dumping of old materials or containers into lakes and streams.

The Department of Agricultural Economics has research currently underway which will develop an empirically estimable model for use in evaluating the social welfare effects of the agricultural use of pesticides. The competence acquired from this effort will be valuable in a similar analysis of pollution control in estuaries.

Studies on the microbiology of the estuarine environments have been in progress in the Department of Bacteriology since 1965. Studies have emphasized the characterization of unusual microbial forms recovered from estuaries, the development of methods for the study of estuarine microbiology, and the evaluation of organic turnover in heavily polluted estuaries. These limited studies could be readily expanded and contribute significantly to an understanding of the general characterization of Florida estuaries.

The President's Science Advisory Committee on world agriculture concluded that food consumption and production in the developing world will have to grow at approximately four percent annually over the next twenty years to meet critical nutritional needs. This target requires an investment in agriculture that appears unlikely. Therefore, it is essential that we explore alternative means for providing these food supplies. A prime alternative with considerable importance to Florida's growth is the development and management of the major estuaries and contiguous continental shelf.

It is of great importance at this time to evaluate the existing characteristics of the Florida estuaries to define existing conditions and to serve as a base of comparison for evaluating changes when they occur. The techniques for the evaluation of estuarine conditions are not well established and the salinity of these environs makes difficult the direct application of methods useful in the evaluation of fresh waters. The Institute of Food and Agricultural Sciences has a statewide group of researchers devoting their efforts to food and agricultural industries. The expertise and research laboratories of the Institute of Food and Agricultural Sciences, the Biological Sciences and the University of Florida can contribute significantly to an evaluation of the estuaries and we wish to participate in a comprehensive program for the preservation, use, and development of estuaries.

Respectfully,

J. H. Herbert, Jr.
Extension Conservationist

For: Dr. E. T. York, Jr.
Provost, Institute of Food and Agricultural Sciences
Dr. George K. Davis
Director of Biological Sciences

cc: Dr. E. T. York, Jr.
Dr. G. K. Davis
IFAS Department Chairmen

UNIVERSITY OF FLORIDA
COLLEGE OF BUSINESS ADMINISTRATION
GAINESVILLE 32603

BUREAU OF ECONOMIC & BUSINESS RESEARCH
221 MATHERLY HALL

March 7, 1968

Director of Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control Administration
Athens, Georgia 30601

Dear Sir:

This is in reply to Mr. Thoman's letter of February 27, 1968 concerning the Clean Water Restoration Act of 1966 which requires that the Department of Interior make a comprehensive study of pollution problems in the nation's estuaries. In addition to sending a letter to me, he also sent letters to two other members of the Bureau staff, Mr. Ronald Beller and Miss Elise Jones.

We met and discussed his letter and each of us readily sees the importance of a study of the pollution problems affecting the nation's estuaries. Here in Florida, we have been very much concerned with these problems and have come to recognize the importance of systematic study and planning to avoid both water and air pollution. In our recent studies of the fishing industry, we have come to recognize the serious economic loss that can be occasioned by actions that modify or pollute the natural conditions required to support our marine resources. Not only does pollution contribute economic injury to the commercial fisheries but to sports fishing and related recreational activities.

We believe that research showing the economic trends and developments in the state that are related to, and dependent upon, the estuaries would be highly useful.

This Bureau has for a number of years been engaged in research to develop useful information on the resources and on economic developments in Florida. For example, we have developed postcensal estimates of population and personal income for all the Florida counties. We believe that the results of this research and study should be brought to bear on the water pollution problems about which you are concerned.

I am sorry that Mr. Beller, Miss Jones and I are unable to be at the meeting in Orlando. Were it not for other commitments involving University work, we would certainly be in attendance for we are vitally concerned with the problems with which your meeting deals. If there are further meetings, I hope that we can participate and we will certainly be glad to assist in dealing with this important subject.

Sincerely yours,

Carter C. Osterbind,
Director

CCO/dw

UNIVERSITY OF SOUTH FLORIDA
TAMPA, FLORIDA 33620

AREA CODE 813: 988-4131

RESEARCH AND DEVELOPMENT CENTER

March 18, 1968

Mr. John R. Thoman
Regional Director - Southeast Region
U. S. Department of the Interior
Federal Water Pollution Control Administration
1421 Peachtree Street, N. E. - Suite 300
Atlanta, Georgia 30309

Dear Mr. Thoman:

As requested by you following my presentation at the public hearing in Orlando, I have given a great deal of thought to my proposal for establishing Estuarine Research Centers.

As I explained during the question and answer period, I would propose a minimum of one Center for each state adjacent to marine waters. To be effective, I believe these Centers would require, on a continuing basis, a minimum of a million dollars a year plus annual increments of eight to ten per cent to keep up with inflation and added costs. I firmly believe that such Centers would become the equivalent of our land grant colleges and could devote themselves to determining what constitutes proper management of all estuarine environments in their state. In addition, these Centers would be responsible for devising any new methods that would allow industry and Mother Nature to co-exist in harmony.

If I have any qualm whatsoever, it is that one million dollars a year seems large for any one state; yet the magnitude and dollar consequence of the problems are such that even this amount per state probably will not suffice.

I am sure you recognize that one of our most serious problems will be the identification of trained scientists, competent and willing to undertake such studies. It is my hope that, by the establishment of such Centers and the focus that these Centers would bring on the problem, scientists naturally will migrate to this area of study.

Because of my own personal involvement in estuary and estuarine research for the last ten years, I would be most anxious to do anything possible to assist you in establishing such a program. Please do not hesitate to call on me for any help that you might need.

Sincerely yours,

William H Taft

William H. Taft, PhD.
Director

WHT:vs

Statement of

Dr. C. P. Idyll
Institute of Marine Sciences
University of Miami

At A Hearing On

The Value of Estuaries

March 12, 1968

My name is Dr. Clarence P. Idyll. I am Chairman of the Division of Fishery Sciences at the Institute of Marine Sciences, University of Miami. Our Institute has conducted extensive research on estuaries, principally in south Florida, and concentrated on the estuarine areas of Everglades National Park. I am speaking today in behalf of the Institute of Marine Sciences and the Florida Academy of Sciences.

Estuaries may be more important to Florida than to any other state in the Union. Aside from Alaska, Florida has the longest coastline (8,500 ~~(4,000~~ miles of beach and estuarine shores) and a very high proportion of this coastline includes estuaries.

Estimates by one of our biologists of tidally influenced estuarine areas in Florida and nearby states give the following comparative figures:

Florida	3,310 square miles
North Carolina	2,575 square miles
South Carolina	389 square miles
Georgia	238 square miles
Alabama	492 square miles
Mississippi	146 square miles
Louisiana	2,731 square miles
Texas	2,413 square miles

For many people the principal natural resource of Florida is its climate and its general environment, and the future ability of the state to attract the visitors so important to its economy depends in large measure on the maintenance in a clean and attractive manner of the edge-of-the-sea areas.

Florida ranks about tenth among all states in the nation in the value of its commercial fishery. Commercial and sport fishing is worth more than $300 million to the state and approximately 90% of the valuable species sought depend heavily on estuarine areas.

Last year the shrimp fishery in the United States was the first ever to reach the ~~billion~~ one hundred million dollar value at the primary sales level. A major portion of this valuable shrimp industry is located in Florida, where the annual value of the commercial catch amounted to over $15 million and that of the live bait shrimp fishery to another $1½ million in 1966. More than half the total value of all sea food landed in the state is attributed to this resource.

The shrimp industry of Florida will be greatly damaged unless the estuaries and bays of the state are preserved. The life history of the commercial shrimp is such that spawning takes place offshore and the young drift or swim to the estuary, where they spend up to half their life. It seems likely that most of the shrimp caught by the commercial and bait fisheries use the estuaries for this substantial part of their existence. The shrimp industry will suffer in direct proportion to the extent that the estuaries are altered or destroyed by pollution, dredging and filling.

Shrimp are only the most dramatic example of dozens of commercial and sport species which will either be severely damaged or destroyed if the estuaries of the state are not maintained. Of the valuable fisheries whose animals depend on the estuaries those for blue crabs, menhaden, mullet, spotted weakfish, and red drum may be mentioned. There are a great many more. It has been estimated that two-thirds of the fish harvested in the United States depend on estuaries for part of their existence.

The reason that estuaries are of such high value is that they are by far the most productive areas of the sea. The richest of estuaries are more productive than the richest of land and far more productive than the open sea. The reason for this great productivity is that estuaries trap nutrients. These accumulate in the shallow, well-lighted areas where photosynthesis by plants can take place. The plant material thus produced is necessary for the production of the various animals in the food chain above. The size of the animal population in each trophic level above the plants depends upon the size of plant production, and the fortunate combination of high mineral content, high illumination and the warm temperatures in Florida make these areas of the utmost importance in the biological system.

Another biological characteristic of estuaries is the extreme delicacy of the balance of their biological communities. They are influenced markedly by the supplies of saline water from seaward and by the supplies of fresh water from landward. The biological balance and productivity are easily upset by excessive amounts of either of these and by alterations in the depth and quality of the water. Harmful changes include marked differences in salinity caused by unbalanced salt and fresh water supplies and the addition of silt, sewage, and chemical pollutants, especially pesticides.

Ecological studies carried on at our Institute of Marine Sciences over more than a decade show that the kind and quantity of plants and animals in the estuary are quickly affected by environmental changes in an estuary. In particular, we discovered that the plant and animal associations were altered in surprisingly rapid fashion by changes in salinity above or below certain critical levels. In the Florida Bay estuary natural conditions of high temperatures and rapid evaporation, with the added pressures of reduced supplies of fresh water, sometime raise the salinity to levels twice as high as normal sea water. When salinities become 50 ppt. or higher the areas become virtual aquatic deserts. Long before this level of salinity is reached, however, the numbers of many kinds of animals are reduced markedly. These include a majority of the animals of interest and use to man.

It is only in recent years that the realization has come to the people of the United States that the edge-of-the-sea areas which were once thought useless are in fact among their principal assets. It does not serve any particular purpose to wring our hands about mistakes made in the past. It will, however, be criminal to continue to make these same errors. We must take the knowledge which we now have and resist with all our vigor possible changes in our estuaries which are the consequence either of carelessness or the satisfying of special interests whose goals may be contrary to the general welfare of the public. Proposed changes in estuaries must be examined with a cold and critical eye.

Waterfront property is among the most valuable of all land for the very good reasons that it provides an opportunity for cheap transportation, that it allows access to the sea for commercial and recreation purposes, that it is esthetically satisfying to live on the sea. It is ironic that by indiscriminate crowding along the seashore, and by unwise and too rapid development of this desirable environment, we are destroying the very attributes that make it so valuable to begin with.

If the problems of mankind are examined closely and traced to their roots, nearly all of them will be found to result from the press of population. Competition for food, space and the other necessary and desirable things of life cause most of our trouble. In the case of estuaries, the interests of many groups collide head to head. The desire of people to live by the seashore, to build marinas, houses, apartments and other structures, to require dredge and fill to make more land, to use the shallow waters as sewers contradicts the necessity for maintaining the integrity of the water and of the resources that are found there. The necessity to produce power, to provide ports, and to support a multitude of other industrial necessities of our life collides with the necessity for us to avoid ruining our environment. Unfortunately, we are unable or unwilling to control the frightening rise or our population. Thus we must find more places for people to live and we must find methods of supporting them by building vast industrial complexes. We will never be able to escape the necessity of balancing the multitude of opposing pressures, most of which have a measure of legitimacy. We are forced to cooperate in examining the relative merits of the opposing requirements and desires and to decide on courses of public action which are of the greatest benefit to mankind in the long haul.

A principle that cannot be too forcefully stated is that the decisions of society on how our estuaries should be used is that if we make a decision in such a way that an estuary is destroyed or severely altered we probably can never rectify the error. It is easy to fill a bay; it is impossible to unfill it. It is easy to destroy a population or a complex of populations of plants and animals; it is impossible to restore these to life again. It is easy to cover the bottom of an estuary with sewage and harmful chemicals; it is probably impossible to vacuum the bottom of that bay to restore its former productivity. Without doubt, the most important message the ecologists must get across to the general public and to those responsible for making the laws and regulations of our country is that estuaries once destroyed are forever destroyed.

Research in recent years has uncovered enough facts to allow us to make the kind of evaluation summarized above, but it is clear to anyone who has examined the problems that there are enormous numbers of blank pages in our textbooks on estuaries. In far too few instances are we able to give facts in quantitative terms, to give chapter and verse to support our pleas for particular action in a particular estuary.

Perhaps the question of greatest current concern is the threat to our estuaries of thermal pollution. One of the absolute necessities of our mechanized society is an abundance of power, and power plants are increasing in number, especially on our estuarine shores. Some power plants have been in existence for many years, using fuel oil as their source of energy. These plants were not built beside large bodies of water merely by accident. The water is a vital part of their operation, since it is pumped through their condensors as a cooling agent. Immense amounts of heat are produced in the generating plants, and staggering amounts of water are therefore required for their cooling. This water is discharged from such plants at temperatures elevated from 10 to 30°F. If you are impressed by the rapid rise in population in the United States, you may be surprised to find that this rate of increase is small compared with the increase of demands for power.

It has been estimated that the demand for power in the United States a short ten years from now will be 444 million kilowatts - double the present load. In Florida the pressure of demand 10 years from now will be even more impressive; we will require 20 million kilowatts compared to the present 7.7 million. An estimated 30% of this power will be supplied by nuclear plants compared to 1 - 2% at present. This means that the number of power plants around the edges of Florida is small compared to what it will be in a few years. More than this, the conventional types of plants using fossil fuel are being rapidly replaced by nuclear power plants. These are not much different in their effect on the environment except in degree. Warm water has been poured into estuaries around Florida for many years, but the quantities of this water will increase enormously as nuclear power plants are built. We are almost without information as to the effect of this on our estuaries. We must not delay a day longer than necessary to obtain the data needed to assess the effects of this new problem in estuaries. The power plants are already with us; they are already putting heated water into our estuaries; they may be changing them to their detriment.

There may be ways of avoiding detrimental changes of heated water or of minimizing them, and indeed there may be ways of turning the heated water to our advantage, as is being done in Long Island where oysters are being raised in the heated effluents. In Biscayne Bay, the Turkey Point Plant of the Florida Power and Light Company is already in operation and its activities will increase in the next few years. A system of overflow canals exists designed to cool the water. It is not known what the cooling effect of these canals will be. It is not known what effects this water will have on the bay. And yet a hundred million dollar plant exists and it will operate. One of the enormous problems facing the people of Florida, and the people in the United States generally, is what will happen to our environment as a consequence of the Florida Power and Light Company and the hundreds of similar plants which exist or will exist in the next few years around the edges of our land.

Thermal pollution is only the newest of the problems faced by our estuaries. There are other problems which have arisen over the years, for which we are only beginning to have answers. The public and the law makers of the United States must be given a sense of urgency in seeking solutions, since the destruction of our estuaries would be a national disaster.

STATEMENT PRESENTED
TO
PUBLIC HEARING ON ESTUARIES
Orlando, Florida
March 12, 1968

by

R. G. Dean
Chairman
Department of Coastal and Oceanographic Engineering
University of Florida
Gainesville, Florida

INTRODUCTION

The problems associated with utilization and modification of our estuarine areas are very broad covering the range from adequate legislation and enforcement of regulations to the task of reclaiming estuaries that have been improperly managed in the past. The pressure for further modification and usage of estuaries is increasing and will continue to increase in the future. Even with the development of strong concern for the preservation of these important resources, it would be incorrect to believe it possible to prevent all land fill projects and discharge of pollutants, etc., in the future. Indeed such a program could be unnecessarily conservative and would not allow the usage of the estuaries to their fullest capacity.

The problem posed is one of rational future development with a program to reclaim some estuaries to a condition capable of supporting desirable biological life. This discussion will be directed toward two aspects of an estuary management, development and reclamation program. The first aspect relates to critically needed research which would be directed toward the development of knowledge and procedures that will allow the direction of the program and decisions required to be carried out on a rational basis. The second aspect is concerned with the use of engineered structures to enhance the tidal flushing action in either the development or reclamation of an estuary.

I. CRITICAL ESTUARINE RESEARCH AREAS

(1) Estuarine Mechanics

Consider the general case of an estuary that is connected to the ocean by one or more restricted openings. Lake Worth, near Palm Beach, Florida, will serve as an example. Lake Worth is some twenty miles long and is separated from the Atlantic Ocean by a barrier island with two connecting inlets, one at the north and one at the south end of Lake Worth. The "forces" that tend to renew the waters include tidal exchanges, wind-driven circulation and mixing and runoff and precipitation.

One of the goals of a national estuary program should be to develop the capability of incorporating the effect of a prescribed (in space and time) set of "forces" on a particular estuary geometry to determine the exchange rates of water and circulation patterns, stagnation areas, etc. Information derived by use of this technique could be invaluable in predicting the effects of a proposed modification or in establishing the optimum design.

Existing hydrodynamic knowledge coupled with the capabilities of large and fast computer systems provide a basis for developing these calculation techniques. Field tests would be necessary to evaluate and refine the procedure.

(2) Climatological Data

In anticipation of the availability of a "rational" procedure as discussed above, a climatological data collecting and/or assembling program should be initiated to make readily available the type of regional climatological information that would be required to employ such a procedure. Here, it is expected that, in cases where the exchange within an estuary may depend primarily on wind, the extreme durations of low wind speed may be the important parameter. In cases where tidal flows may govern the renewal of waters, adequate information may be presently available.

(3) Biological and Chemical Response

It is important, once an estimate of the hydrologic response of an estuary is available, to be able to translate this information into the resulting effect on water chemistry and biological life. For example, suppose that it has been determined that construction of a causeway will increase the maximum water residence time within a period of ten years from one month to three months. This information would be much more meaningful if it could be interpreted in terms of oxygen reduction, pollution increase, impact on biological life, etc.

II. ENGINEERED STRUCTURES

One approach toward the benefication of existing estuaries with low quality water is the construction of systems that will enhance the circulation of waters through the estuaries. Many estuaries are connected to the ocean by inlets with little regular inflow of fresh water. As a result, the waters at great distances from the inlet are characterized by very long residence times. If one or more "check valve" structures could be constructed to utilize tidal fluctuations to establish a unidirectional flow near the head of the estuary, the water quality in these areas could possibly be greatly improved. The selection of the flow direction through the check valve would depend on natural conditions in the area, but it would seem that an ebb flow with the structure designed to open during low tides would improve water quality along the entire length of the estuary. Perhaps in some areas it would be best to design a structure that could allow bidirectional flow depending on the seasonal wind patterns.

STATEMENT FOR THE RECORD

PUBLIC HEARING ON NATIONAL ESTUARINE POLLUTION STUDY

March 12-13, 1968

Park Plaza Hotel
Orlando, Florida

BY

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
BROOKSVILLE, FLORIDA

The Southwest Florida Water Management District was created by an act of the Florida Legislature of 1961 and operates in a full range of water management responsibilities within southwest central Florida. Foremost in our responsibilities is the construction of the "Four River Basins, Florida" multi-purpose project which was authorized by the 87th Congress, Second Session, and has been receiving annual appropriations for construction and continued planning since 1964. One of the significant requirements that the United States set forth to the Southwest Florida Water Management District was to "preserve outlet waterways needed for proposed works, or secure rights thereon, to permit required discharges without causing significant damages under present or future conditions of development". Therefore, the need to provide sufficient capacity for the outfall of the flood control discharge channels in and through estuaries is often a responsibility of this District. One of the major estuarine areas of the state, Tampa Bay, lies within the District and, in addition, approximately twelve significant streams and hundreds of smaller coastal streams find their way to the Gulf of Mexico within the 300 miles of coastline in this District. Rapid urbanization is forcing many changes in these bays and streams and sometimes causes the project outlet channels to be carried well into the estuarine areas. Therefore, we ask that in considering the optimum uses and future development potential of the estuarine resources that these flood outflow capacity responsibilities be remembered.

We are, of course, very concerned about the quality of the water resources in the estuaries. The combination of agricultural wastes, domestic wastes, industrial wastes and thermal pollution within estuaries is intensifying the need for research on the effects of this pollution in encouraging the growth of undesirable aquatic weeds, such as eurasian water milfoil and Florida elodea, over vast acreages within estuarine environments. Attempts at chemical control of these aquatic weeds are presently necessary to provide outflow capacities and navigational depths, but the treatment -- and the dying plants -- contribute to the contamination of the treated area. We suggest that this matter be carefully considered as a primary research need.

The Southwest Florida Water Management District recognizes and appreciates the complexities of the tasks before you and will be pleased to assist in the improvement of the estuaries by coordinating and planning with you how those of us who must be interested in both the development of the estuary and its water quality can best work together to produce the benefits our responsibilities require.

DT:mb

STATEMENT BY G. E. DAIL, JR., EXECUTIVE DIRECTOR
CENTRAL AND SOUTHERN FLORIDA FLOOD CONTROL DISTRICT

TO

PUBLIC MEETING FOR NATIONAL ESTUARINE POLLUTION STUDY
MARCH 13, 1968

COMMENTS ON THE RELATIONSHIP OF WATER MANAGEMENT AGENCIES AND ESTUARINE POLLUTION

The interactions between water management agencies, such as the District, and estuaries largely center in the fresh water input to the estuaries. Problems arise from both the quantity and quality aspects of this input as variations are introduced into the system. Modern man inevitably introduces variations, and nature, just as inevitably, moves to achieve a new balance. Unfortunately, man does not always anticipate or appreciate the resulting environmental changes. The principal point lies in the fact that the entire problem revolves around man's choices and desires.

In terms of the total system in southern Florida, some understanding may be gained by a short review of the basic topographic and climatologic factors and the course of man's development of the area.

The climate of the area tends strongly to a wet season-dry season regime. The intensity of the extremes varies from year to year, largely dependent on wet season rainfall and the incidence of hurricanes and other tropical storms. The topography of the area is quite flat and characterized by swamps, ponds, sloughs, lakes, and relatively few well developed streams. The primeval system was characterized by storage of a major amount of the wet season supply and a recession in the following dry season. The high water table and corresponding large surface water areas encouraged a high evapo-transpiration rate. Consequently a major share of the annual supply was depleted in this manner. The discharges to the coastal areas were relatively high during the wet season with peaks following major storm events. The poorly developed surface drainage tended to elongate the recessions, giving a relatively stable gradually receding water supply to the coast during the dry season.

Man's development efforts, for more than half a century, were bent almost exclusively to drainage. In terms of water supply, these drainage efforts effectively reduced the storage capacity of the system and have cumulatively resulted in larger flows during the wet season and have consequently reduced flows during the dry season.

At the time of the District's establishment in 1949, it had become generally recognized that the overall problem could not be solved by additional drainage alone, but that conservation of water for the following dry season was a necessary adjunct. Consequently the Project, while still basically oriented to a flood control concept, had designed into it rather major water conservation features. The current investigation by the Corps of Engineers of the overall water supply of Southeastern Florida has highlighted the need and justification for much more extensive water conservation features.

As water conservation features develop and become effective, the net result will be a reduction of flows to the coast. In fact, during the dry season, anything above a very minimum flow in most cases would have to be released by intent. Since water supply is going to be insufficient to meet demands in the foreseeable future, this brings up the very knotty problem of allocations.

The quality aspects of the inflows to tide water have undergone changes as well. Land clearing and the practices of agriculture has increased the silt loading considerably. There has been a continuing increase in the nutrient load. Pesticides and other exotics have entered the system as well as the all too familiar urban pollutants.

There are a number of conclusions that may be drawn from this state of affairs. One of the primary ones is that basic irreversible changes have taken place and will continue to take place in the overall system and consequently there can be no thought of returning to the primeval state. There are certain things that can be done to alter the course of events if sufficient knowledge exists to allow projection of the results of any given set of actions. In-so-far as water management agencies are concerned, this largely has to be in the area of controlling the inputs to the estuaries in terms of the rate and time distribution of discharges.

In the area served by the Central and Southern Florida Flood Control District, the Corps of Engineers and the District have faced the problem of excessive wet season flows in the design of almost every major coastal outlet. The District expects to see requests for dry season flow augmentation for the benefit of estuaries in the future. There is an obvious answer to both of these problems in the replacement of the lost system storage.

The flat topography of the region makes the creation of artificial storage a difficult and expensive proposition. It requires rather extensive areas for storage in any case. The risks involved and the economic costs increase rapidly with storage depth. Also to be considered are the costs of transporting water to and from the storage facilities under the required low head conditions. Consequently, the amount of storage provided is a function of the value attached to the stored water balanced against the costs of providing and operating the system. Allocations should then be made in the light of system capacity and overall demands. As water becomes relatively more valuable, the justification of further storage and transport facilities becomes apparent. However, it should be recognized that this process is subject to the law of diminishing returns and to an ultimate limit of possible supply.

This discussion has necessarily reached rather far afield from the assigned topic of estuarine pollution. From the point of view of the District, the demands for this purpose are only one group out of an entire spectrum of socio-economic demands, and must be viewed in its proper perspective in this overall problem. The District and the Project has been rapidly changing from a single-purpose flood control concept to an overall water management viewpoint as the need has appeared. There has developed a great need for an accepted methodology for distributing scarce resources and fixing the level of economic goods that can be either expended or foregone in favor of non-market demands. In other words, a realistic and rational method of allocation of a limited water supply in the face of unlimited and competitive demands.

MOSQUITO CONTROL AND THE ESTUARINE ZONE

JACK SALMELA, PRESIDENT

FLORIDA ANTI-MOSQUITO ASSOCIATION

When you think of mosquito control, what is the one thing that comes to your mind? You most likely think of insecticides. And when you think of insecticides you think of something undesirable.

Since pesticides receive so much attention in regards to pollution of water, I would like to say a few words about the history of mosquito control in Florida.

Mosquito control made its greatest expansion shortly after World War II. During the war, DDT was perfected and used extensively by the armed forces. In Florida some of the bases in the coastal areas used airplanes for spraying with DDT to provide relief from swarms of salt-marsh mosquitoes. The mosquitoes were so bad that the military felt justified in spraying much of the surrounding residential areas as well, and the results were nothing less than fantastic. So when the war ended and the bases began to deactivate, the mosquito control districts had no alternative but to purchase surplus airplanes and continue the spraying.

We not only sprayed the residential areas, but attacked the mosquitoes in the breeding areas as well. It is more efficient to destroy the mosquitoes while they are concentrated in the larval stage than it is after they have dispersed as adults. DDT was so effective until there was hope of eradication of the mosquitoes. However, our hopes were short-lived. We were not heroes for very long.

We were killing most of the mosquitoes, but in every brood there were a few that could withstand the effects of DDT. By spraying time after time, we soon eliminated the susceptible ones, and through the process of selecting those that could withstand the effects of DDT, we created a strain of mosquitoes that we could not kill. This is what we know today as resistance. We did not create resistance, we merely selected those that were resistant.

Because of this failure and the widespread use of DDT which is a very persistant material, mosquito control acquired a reputation that will long be remembered by, particularly, conservationists. However, the picture is altogether different now.

The Florida State Board of Health was able to promote legislation which provided funds for research and permanent control work, and most of the marshes have been altered by either diking or ditching.

One method we have of sampling the density of mosquitoes is what we call a light trap. This apparatus consists of a light that attracts mosquitoes, and a fan that traps them in a jar. Fifteen years ago we used to catch more mosquitoes in one night than we do now in a whole year. And contrary to what you might think, this tremendous reduction is due almost entirely to our permanent control work and not to the use of insecticide.

We still do a tremendous amount of adulticiding, but we no longer use persistant compounds like DDT. The larvicide we use is mostly Paris green, and it is very selective. I have never seen anything killed by Paris green other than mosquito larvae. Where we used to plaster the entire marsh with DDT, simply because we did not have a suitable means of inspecting the huge marshes to find exactly where the breeding was located; we now use helicopters to pinpoint the breeding; and seldom treat a breeding area as large as this room. Most of our larviciding in Brevard County is confined to holes about the size of a desk.

I am pleased that consideration is being given to the estuarine zone per se. We were afraid that the glamour of oceanography would focus all attention in other areas. Who wants to splash around in muddy water and wade through mangrove marshes when he could be diving in beautiful clear, blue waters? Unless more attention is given to the estuarine zone, the deep-sea diver might not have the abundance of marine life he enjoys on the Continental Shelf.

I personally do not know of any mosquito breeding in the estuarine zone in Florida that is caused by pollution. However, pollution in a fresh water habitat is another matter. The mosquito Culex quinquefasciatus thrives on pollution. Blind mosquitoes are breeding in certain brackish waters because of nutrient from sewage treatment plants, and I could give a first-hand account of what the effluent does to an oyster bed, but there are others here that are more qualified to talk on that subject. The problem of blind mosquitoes could possibly become much worse because some species tolerate a great deal of salt.

Of course, pollution is not the only problem that adversely affects the estuarine zone. The effects of dredging and filling are well known, and damming is another.

Mosquito control has constructed dikes around many thousands of acres of salt-marsh, and even though our work has been of tremendous benefit to most forms of wildlife, our dikes undoubtedly interfere with free passage of marine organisms. We desperately need information on how to manage our mosquito control impoundments with the least damage to marine life.

It is much easier to prevent a problem than it is to correct one. Every effort should be made to stop the spread of Eurasian milfoil. This weed is already established along the west coast of Florida, and is spreading rapidly. It thrives not only in fresh water, but will tolerate salt water as high as one-third sea strength. This plant makes a solid mat several feet thick, and grows in water up to nine feet deep. It could destroy a high percentage of our estuarine zone.

The problems of the estuarine zone are many and very complex. In order to save what we have, and possibly recover some of that which has been lost, we will need: 1. Funds 2. Enforcement 3. Research. The first two are self explanatory, and that leaves the one thing that is really the most important of all - research.

With that in mind it is a pleasure and a priviledge for me to have the opportunity to present to you one of the most outstanding biologists in the State of Florida. He is presently the director of the Entomological Research Center, Florida State Board of Health, Vero Beach, Florida. He is truly a conservationist. I present to you Dr. Maurice Provost.

AMERICAN SOCIETY OF CIVIL ENGINEERS

Florida Section

Reply to:
2626 Edgewater Drive
Orlando, Florida 32804

11 March 1968

Director of Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control Administration
Athens, Georgia 30601

Subject: National Estuarine Pollution Study

Dear Sir:

The Florida Section, American Society of Civil Engineers, recommends that the optimum use and future development of Florida estuarine resources be that which will benefit the maximum number of people.

In addition to the above, we further recommend that the regulation and research aspects of future development of estuarine resources be determined by the combined efforts of the Florida Air and Water Pollution Control Commission, Florida Board of Conservation and appropriate local regulatory agencies.

Yours very truly,

Walter H. Kuhrt, Jr.

Walter H. Kuhrt, Jr., President
Florida Section, ASCE

WHK/lk
cc: Mr. Walter L. Revell, Executive Director, Florida Engineering Society
Mr. L. A. Woodman, District 10 Director, ASCE
Mr. Harley Gilmore, Secretary-Treasurer, Florida Section, ASCE
Mr. John R. Thoman, Regional Director, U. S. Department of Interior
Mr. Nathaniel Reed, Administrative Assistant, Office of the Governor, Tallahassee, Florida
Mr. Lyman Rogers, Chairman, Governor's Natural Resources Committee, Office of the Governor, Tallahassee, Florida

UNIVERSITY OF FLORIDA
GAINESVILLE, 32603

COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF [redacted] ZOOLOGY

26 February 1968

Mr. John R. Thoman, Regional Director
Federal Water Pollution Control Administration
U. S. Department of the Interior
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Dear Sir,

Probably the main problem with which one must contend in dealing with the preservation and management of our estuaries is the fact that these areas are so important in so many different ways. Unfortunately, the people to whom they are important have, in many cases, diametrically opposite views as to how they should be utilized. Probably the management of no other type of environment poses so many perplexing problems.

Coastal areas throughout the country are rapidly being modified. Nowhere is this occurring more rapidly than in Florida, where numerous bays and marshes have been drained and filled for housing developments. Industry also has located in these areas, and where industry is located there almost invariably is attendant pollution. Much more of our coastline obviously will be similarly changed or modified in the near future.

Estuaries are of extreme importance to our welfare for two basic reasons:

1. Estuaries (including surrounding marshlands) are, biologically speaking, among the most productive communities known, and they are of the utmost importance as breeding, nursery, and feeding grounds for numerous species of economically important animals. Destruction of the environment would necessarily result in the elimination of the animals and the loss of millions of dollars in income to many people.

2. Coastal land (much of which obviously is composed of estuaries) is very valuable property, particularly with regard to real estate and industrial development.

Obviously the interests of people whose livelihoods depend upon one or the other of the above are in sharp conflict. Therefore, one of the most important things with which we are faced is how best to resolve these problems so that one or the other groups is not unduly discriminated against.

One cannot be so naive as to think that conditions can, or even should, remain as they were in pre-Columbian times. It would be unfair to deprive people of the right to build shorefront homes, for example, and there are of course very practical reasons why certain undustries and businesses must be located close to the sea. Obviously one cannot expect the waters of a major harbor to be as pure and clear as they were originally. On the other hand, it is perfectly obvious that at the present time business and commerce has a disproportionate voice in how our estuaries are utilized. Powerful lobbies effectively block measures that would curtail pollution, and land continues to be developed without regard to the future.

Among the different kinds of economically important animals using estuarine areas as breeding or nursery grounds, or which live much of their adult lives therein, are oyster (*Crassostera virginica*), bay scallop (*Aquipecten irradians*), hardshell clam (*Mercenaria mercenaria*), blue crab (*Callinectes sapidus*), stone crab (*Menippe mercenaria*), several species of shrimp (*Penaeus duorarum, P. setiferus, P. aztecus*), and various kinds of fishes (e.g., tarpon, *Megalops atlantica*; striped bass, *Roccus saxatilis*; sea trout, *Cynoscion nebulosus*; several species of mullet, *Mugil* spp., several species of snook, *Centropomus* spp., and various croakers, *Micropogon undulatus*, *Pogonias cromis, et al*). In addition to these, many kinds of planktonic organisms that are vitally important in the food chains of other economically important offshore marine species are produced in estuaries. Bays and their surrounding marshlands are also important as feeding and breeding grounds for various kinds of waterfowl, many of which are highly prized game species. Finally, speaking from a strictly scientific point of view, one always feels deep regret when a particular species, no matter how small or insignificant, passes into final oblivion, from which there is no return.

One of the most distressing things that has happened in recent years is the mismanagement of the Everglades. The coastal of southern and southwestern Florida is extremely important as a breeding and sursery ground for the animals mentioned above, and although much of the Everglades is, strictly speaking, freshwater, the problems of the glades and of its surrounding estuaries are closely interrelated. The reasons for the recent problems of this area are well known, and I will not go into them here. Suffice it to say that certain interest groups have found it more expedient to simply drain most of the excess water from Lake Okeechobee directly into the ocean, rather than to allow it to drain southward into the glades. This is an excellent example of the backward thiniing, "me first" philosophy that prevails throughout much of the country. The most unfortunate thing is that this situation could be corrected relatively easily, much more so than could many other situations.

The question is, then, what should be done so that estuaries can best serve the uses of all. Some solutions are obvious, and merely require such things as common sense, money, and a little less selfishness. These things sound simple, but often they are surprisingly difficult to do much about. Other solutions are less obvious, and there must be considerable give-and-take among the individuals involved. I do not pretend to know all the answers, nor would I know how to implement all the suggestions I have. The following, however, are logical steps that should be taken before we can begin to exercise proper management of these areas:

1. Better maintenance of those areas presently set aside as preserves. Adequate funds to make sure that this is properly carried out, as, for example, additional canals and reservoirs for supplying the proper amount of water to the Everglades.

2. The setting aside of certain strategically placed estuarine areas as reserves.

3. Controls regarding the indiscriminate filling in and draining of bays.

4. Continued, and further increased, research on the productivity and biological potential of estuaries and their included biotas. The allocation of increased research funds for this purpose.

5. Stricter controls of undustrial and domestic pollution.

I hope the above will be of some interest and value to those concerned with the problem at hand.

Sincerely,

Carter R. Gilbert

Carter R. Gilbert
Vice-President
Southeastern Division
American Society of
Ichthyologists and
Herpetologists

Statement to Public Meeting of

THE UNITED STATES DEPARTMENT OF THE INTERIOR FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

Park Plaza Hotel
Orlando, Florida
March 12 and 13, 1968

By
PRESIDENT HUGH F. McKEAN
Rollins College
Winter Park, Florida

Florida is a great state. Its economy is strong. Its schools and colleges are good. But its future is threatened because its rivers, estuaries, lakes, and coastal waterways are being polluted.

The state, in effect, is being robbed but not by thieves or villians. It is being done by some of the most enthusiastic "Floridians," its "developers," who want to make a quick dollar and move on. The real villians are the rest of us who are letting this happen.

My sympathies are with those trying to stop the industrial and municipal waste pouring into the rivers, the sewage going into the sea, the fertilizers and all other kinds of wastes flowing into the lakes and into the underground rivers. They are trying to save more than the fish, the birds, the alligators, and all the rest of Florida's wildlife which is being threatened. They are trying to save more than the beauty of the Indian River, the Banana River, the St. Johns River, and all the other bodies of water which lie in and around Florida. They are trying to save the balance and the ancient order which has made Florida a near paradise and a source of vast physical wealth for millions of Americans.

But their undertaking is a big one, and they could easily lose. The "developers" and the exploiters are organized. Their motives are powerful. The rewards they seek are tangible.

The rest of us see the yellow water, the tangle of weeds around the shores of the lakes, the white bellies of dead fish and the newspaper pictures of the poachers. We shake our heads and utter an angry word and then turn our minds to something more "pleasant."

Unfortunately, there seems to be a pattern which is being followed once again. We have to make such a shambles of our environment that the hotels stand empty, the waters become yellow and stagnant, the air too foul to breathe, before enough people see the folly of contaminating the environment, before we can expect any real action.

When it is too late, and everyone sees what a few saw decades earlier, there are shrill demands for tax monies from the state and federal governments. Millions of dollars then need to be spent trying to bring back only a suggestion of the beauty, the order, and the prosperity which everyone assumed would last forever in spite of man's stupidity.

There is one bright side to the picture. Millions of Floridians know the dangers and the costs of upsetting the balance in nature which has made this beautiful state. If they will only speak, the beauty, the order, and the economy of Florida could be saved.

HFM:rjd
3/11/68

THE PRESIDENT

March 11, 1968

Mr. John R. Thoman
Regional Director
U.S. Department of the Interior
Southeast Region
Suite 300, 1421 Peachtree St. N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Thank you very much for your letter of February 19th, extending Governor Kirk's invitation to present a statement at the meeting in Orlando on March 12 and 13, on the optimum use and future development of estuarine resources.

Until just now I had hoped to be able to attend. Unforeseen circumstances, however, have changed my plans and I am being called to New York at last minute's notice. Unfortunately, the attached statement prepared by Dr. John Morrill of our Natural Sciences Division will arrive too late to be included in the program. I am forwarding it to you, should you still find it to be of value. I regret that this could not be included in the presentation at the meeting.

Sincerely,

John Elmendorf
John Elmendorf

Attach.

NEW COLLEGE, SARASOTA, FLORIDA 33578 TELEPHONE: 813/355-7131

MEMORANDUM

DATE: March 11, 1968

TO: President Elmendorf

FROM: John Morrill, Natural Sciences

RE: Clean Water Restoration Act, 1966 and letter from John R. Thomas requesting statement on use and future development of estuarine resources.

In my opinion a critical need in understanding the Sarasota Bay marine-estuarine system is a thorough survey of the published and unpublished literature on the hydrography, geology, biota, fisheries, land development programs and pollutant sources of the past and present.

Once what is known about the Bay's system is summarized as completely as possible then future short-and long-term problems and trends may be discerned and intelligently discussed. The literature survey should form the foundation for future descriptive and corrective programs as well as contributing basic and much needed facts for the current and continuing controversies between public and private interests regarding the use and abuse of the Bay and its freshwater tributaries.

In my opinion the following studies are in order and are needed:

1) Tidal and wind current studies to establish circulation patterns throughout the Bay and not just in the regions of the major channels and passes between the Bay and the Gulf of Mexico.

2) Survey of the chemical characteristics of the Bay's waters and of the Bay's tributaries and to establish sources and amounts of fresh water and organic pollution.

3) Surveys of the biotic communities, benthic and planktonic communities throughout the Bay and throughout the year.

4) Determination of rates of silting relative to kinds of water, bottom organism communities and man-disturbed bottoms such as dredge and fill areas.

5) Survey of fishing resources (shell and fin; commercial and sport).

6) Survey of recreational developments on and near the Bay and to assess the economic assets of the Bay now and in the future.

7) Finally there is need of a study which predicates possible causal relations between future deterioration of Bay waters and resources and the human communities adjacent to the Bay.

THE ZOOLOGICAL SOCIETY OF FLORIDA

EDUCATION • RESEARCH • CONSERVATION

[redacted]

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Attorney to the Society
JOHN F. MUCKERMAN

Founder
WYNANT DAVIS HUBBARD

March 25, 1968

NEW ADDRESS:
Museum of Science
3280 So. Miami Avenue
Miami, Florida

Mr. John R. Thoman
Suite 300
1421 Peachtree Street, N. E.,
Atlanta, Georgia 30309

Dear Mr. Thoman:

Enclosed herewith is a statement unanimously approved by the Board of Directors of the Zoological Society on the subject of Estuarine Resources.

This is in accordance with the request in your letter of February 23, 1968 and my letter to you of March 11, 1968 in which I stated that we could not be present at the conference in Orlando but would send a statement within fifteen days.

If you have any questions about the enclosed statement, or would like any supporting information, please write to me at the address below.

Thank you for this opportunity of presenting our views, and assuring you of our cooperation, we are

Very truly yours,
ZOOLOGICAL SOCIETY OF FLORIDA

M. A. BASKIN
President
1023 Alfred I. DuPont Bldg.
Miami, Florida 33131
Tele: 377-4508

Encs:
MAB/cw
cc: Mr. Nat Reed, Governor's Office, Tallahassee
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March 25, 1968

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3280 So. Miami Avenue
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STATEMENT RE: ESTUARINE RESOURCES

The importance of estuaries and adjacent brackish-to-fresh-water marshes, particularly in the South Atlantic and Gulf coastal states, is often not fully appreciated. Scientists have shown that these areas are among the most productive in the world from the standpoint of basic plant material necessary for marine production of animals. Estuaries serve as nutrient traps and provide protected havens for fish, shrimp and other animals when these are in their helpless early stages of development.

The purpose of preserving our estuaries and their abundant wildlife is not fundamentally for the benefit of the animals, but for the benefit of people. In South Florida it is important first for the tourism which includes sport fishing as well as other tourist activity vital to the local economy. It is also important to commercial fishing, not only for its economic importance but to help supply essential protein food for humans. Estuaries act as nursery grounds from which most of our coastal fisheries, both sport and commercial, derive their adult animals. It is wise therefore to develope these areas in a rational manner to preserve their unique values for future as well as present human use and enjoyment.

PROBLEM I

In South Florida the most immediate problem is one which has the added urgency that a time deadline is rapidly approaching, that is, the Turkey Point plant of Florida Power and Light Co. Two conventional power plants are now in operation and two nuclear plants are under construction and scheduled to start up about 1970.

The question of the effect of large quantities of warm water in South Biscayne Bay is a serious one. There are two problems:

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(1) The biological problem of what temperature the animals and general ecology of the area can stand.
(2) The engineering problem of what economical method could be devised to cool the water before it is returned to the bay, bearing in mind that any added cost will ultimately be born by Florida electric consumers.

We understand that the biological problem (1) is the subject of proposed studies by the Institute of Marine Science of the University of Miami. These studies should be funded by government agencies as soon as possible because of the time deadline mentioned above.

We understand that the engineering problem (2) is being studied by competent experts at the expense of the Florida Power and Light who have been most cooperative in studying this entire problem.

PROBLEM II

The flow of water into the Everglades National Park must be improved. To this end the U.S. Corps of Engineers who control the Lake Okeechobee dikes and the Central & South Flood Control District should cooperate for the good of all. In addition to the benefit to wildlife and acting as nurseries for commercial shrimp and other fishing enterprises there is the added benefit of high water levels in the Everglades holding back the intrusion of salt water into the city water supplies on the east coast.

PROBLEM III

Associated with this problem is that of the southeast Florida coastline where salt control dikes parallel to the coast, pierced by canals, have been built in such a way as to encourage the out flow of fresh water to the Bay. The flow of fresh water concentrated at the mouths of the canals may upset the ecology of the salt water bay. This could possibly be prevented by small ditches or spreader canals on the bay side of and parallel to the salt control dikes with diversion of the fresh water from the canal mouth into these ditches, so that the fresh water will overflow from spreader canals and flow in a shallow sheet over a large area into the Bay.

This would require further research by the Institute of Marine Science which has already done work on this and other related problems.

PROBLEM IV

In connection with the preservation of estuarine resources we believe that the Florida Internal Improvement Board which controls state submerged lands should be more careful about selling such land to the upland owners. Serious consideration should be given in each case to preserving these submerged lands for the public good.

CONCLUSION

The entire problem of Estuarine resources needs the cooperation of the U.S. Corps of Engineers the Central & South Florida Flood Control District and the Internal Improvement Board among other government agencies. We understand that signs of this long sought cooperation have appeared and this should be commended and approved.

We believe that the Federal Water Pollution Control Administration of the U.S. Dept of Interior can greatly aid in this goal.

Be it therefore resolved:

I That every effort be pursued to see that research on thermal problems of the nuclear plant at Turkey Point be carried out fully and immediately.

II That every effort be continued to see that the Everglades National Park be insured an adequate and continuous flow of water.

III That the proposed salt control levee and locks together with the spreader canal system be given serious consideration.

IV That the state Internal Improvement Board be very cautious about the further disposal or sale of bottomlands keeping in mind the possible irreversable damage to the ecology of such areas.

ZOOLOGICAL SOCIETY OF FLORIDA
BY:
M. A. BASKIN
President

cc: Mr. Nat Reed, Governor's Office, Tallahassee.
Dr. Tabb, Institute of Marine Science.
Dr. Richard Robbins, Institute of Marine Science.

PATUXENT RIVER ESTUARY STUDY
WITH SPECIAL REFERENCE TO THE EFFECTS OF HEATED STEAM ELECTRIC STATION CONDENSER WATER UPON ESTUARINE ECOLOGY

J. A. Mihursky
Hallowing Pt. Station
N.R.I. Ref. No. 63-66

TITLE: Patuxent River Estuary Study with Special
Reference to the Effects of Heated Steam
Electric Station Condenser Water Upon
Estuarine Ecology

INTRODUCTORY NOTE: The Potomac Electric and Power Company (Pepco) is presently constructing a steam electric station (S.E.S.) at Chalk Point on the Patuxent River estuary. Production of power with one unit in operation is tentatively scheduled to begin in spring of 1964. The second unit will go into operation one year later. Each unit is rated at 335mega-watt (MW) capacity. Typical of such S.E.S. plants, it will require river water for generator cooling; a non-consumptive water use of 500,000 g.p.m. is anticipated. According to Pepco's proposal, the heated water is to be returned to the estuary upstream from the point of intake. A summer differential of 11.5°F and a winter differential of 23°F is anticipated between influent and effluent waters.

HISTORICAL BACKGROUND: Previous to 1940, biological interest in temperature effects upon living systems, specifically poikilotherms, was sporadic and no definite pattern was evident other than that systems were not able to exist above or below certain critical levels. A concept of temperature acclimation was established, however (Sumner & Douderoff 1938). From 1940 to the present, interest in thermal requirements for aquatic organisms increased, especially in relation to fishes (Brett 1946, 1952, 1956; Brett & Alderice 1958; Brett, Holland & Alderice 1958; Bullock 1955; Cocking 1957, 1959a; 1959b; Donaldson, L.R. & F. J. Foster 1941; Douderoff 1942; Fry 1958; Fry et al. 1942). Mcleese (1956, 1958) has made important contributions in the invertebrate field. In the past decade Fry and Brett have greatly added to our present concept of thermal requirements for aquatic organisms. The emphasis now is on temperature limits necessary for a continuation of the species as opposed to maximum temperature tolerance of adult organisms. From the species point of view, the ability of the adult to survive a certain maximum temperature is meaningless unless it is also able to (1) grow, (2) avoid predation and (3) reproduce. More than a half dozen theories were expounded as explanation for heat-death previous to 1940 while more recently Heibrunn (1948) suggests changes in the liped structure and Precht et al (1955) propound a theory based upon protoplasmic viscosity which in turn is related to protein stability in relation to temperature and bound water. A key aspect from the organismic viewpoint is that temperature may act through metabolism (Fry 1947; Provasoli 1958). To quote from Brett (1959):

"Temperature, then, influences activity by governing the relative rates of energy demand for performing essential work (e.g., swimming, digesting, courting, etc.). Since the characteristic feature of a controlling factor is to be operative at all levels, the animal never escapes the assets or liabilities imposed. A striking example of this relation can be taken from recent work on temperature and cruising speeds of young salmon,..." For sockeye the maximum sustained swimming speeds at 10° C (50°F) and 19°C (66^{0}F) are approximately equal but, because of increased metabolic demand and the elevated level, energy reserves would be exhausted 1 1/2 to 2 times as fast as 19°C.

Provasoli (1958) notes that temperatures may be a nutritional variable for certain microorganisms. Vitamin B_{12} requirements for flagellates were found to increase several hundred-fold with a small rise in temperature when the latter approaches the lethal point. Consequently death seems to be due to a dietary deficiency rather that to a direct temperature effect.

Thus it is evident there are many subtle interacting phenomena involved other than just delineating laboratory obtained "LD 50" thermal values in order to understand the ecological results to be expected with temperature changes.

In addition, when considering heat effects upon an entire aquatic environment, botanical as well as animal considerations must be made. It is sufficient to recognize that radical alterations of primary production within the aquatic habitat may disrupt the entire animal community.

The biologist's awareness and concept of thermal influences upon living systems now can be put to use due to the great increase in thermal loads imposed upon various bodies of water by steam electric stations. The production of electrical power with coal or oil fired plants requires a considerable amount of water to act as a coolant. Within recent decades the increased demands for electricity has resulted in large increases in MW capacity of existing plants and the construction of many new plants of ever increasing size. Presently most plants are in the 200-800 MW range while in the future plants of 1000 to 2000 MW and larger will be required. (Homan, Schweikart & Smith 1962).

Although the relative volume of natural waters is fixed, or possibly decreasing, the power industry desires to increase thermal loading by a significantly large factor. Consequently the term "thermal pollution" has become commonplace and thermal loading of the aquatic habitat has become a real problem for the biologist rather than a laboratory exercise. Maximum summer water temperatures below S.E.S. commonly exceed 100°F. Wurtz (1962) noted a Pennsylvania stream high of 115° F below a plant where recirculation occurred due to low flow conditions.

Published results from investigations of thermal influence below various plants have been few and only the Delaware River work (Trembley 1960, 1961) attempted a broad ecological study. Except for Markowski's (1959, 1960, 1962) essentially qualitative investigations in England no estuarine thermal pollution studies have been undertaken. Indeed, the Advisory Committee's report on stream temperature control in Pennsylvania (1962) reported "There is almost no useful information available on the effect of discharged heated wastes into estuarial waters"... In view of the tremendous recreational and commercial values attributed to estuaries, it is probably unnecessary to expound on the great need of an adequate evaluation of thermal pollution upon these waters.

PHILOSOPHY BEHIND EXPERIMENTAL APPROACH: As is evident from the preceding paragraphs, the biologist, from necessity must approach a thermal study, indeed any pollution study, with the understanding that for a proper interpretation of what actually is happening in the aquatic community he must be aware of all the interacting environmental forces, both physical-chemical and biological. A study of one species or one taxonomic group would not answer the question "What ecological consequence is a thermal load to a given estuary?" This I believe *is the question to be answered*. Similarly a complete examination of a single station located at the maximally effected zone would not answer this question, although data from such an investigation is valuable for anticipating the consequences of excessive thermal loading of our bays, streams and lakes. Let us hope we do not allow the problem to reach this magnitude. The Delaware River studies have already established what to expect in areas where maximum temperatures reach and exceed 100°F. Among the groups examined, all naturally occurring organisms except one fish species (*Fundulus diaphanus*), one family of macroinvertebrates (*Tendipididae*), one diatom family (*Fragillariacae*) and blue-green algae (chiefly *Lyngbea* sp. and *Oscillatoria* sp.) were eliminated from the aquatic community during the summer months. Repopulation of this zone during the cooler seasons depends entirely upon passive and active reinvasion from nearby normal temperature areas.

The Patuxent Studies, which are predicated upon a holocenotic or ecosystem concept, aim towards an understanding of the environmental and biological complexities that exist in the study area. It is recognized however, that although the ideal is to define the Patuxent ecosystem which is regarded as the basic unit of study, subdivisions of this complex can be analyzed and investigated.

We also recognize that the general problem of thermal pollution can be it is probably unnecessary to expound on the great need of an adequate evaluation of thermal pollution upon these waters.

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We also recognize that the general problem of thermal pollution can be approached from two directions: (1) field studies concerned with individual species response and whole population responses to existing environmental conditions and (2) laboratory investigations of a physiological, etc., nature. It is obvious that the field studies must be given priority at this time since plant operations are to begin in the spring of 1964. If time will allow a laboratory program will be developed at a later date.

OBJECTIVES:

1. To establish base line physical, chemical and biological characteristics of the study area during the period of time existing before operation of a steam electric station at Chalk Point; earlier published and unpublished information is to be utilized where possible.
2. To determine the pattern of heated water distribution within the study area after commencement of S.E.S. operations.
3. To determine the effect of added heat loads upon water quality within the study area.
4. To determine the qualitative and quantitative effects of added heat loads upon the biological communities existing within the study area.
5. To evaluate these anticipated water quality and biological changes in terms of estuarine ecology.
6. To contribute to knowledge concerning the biodynamics of an estuary in order to establish criteria to allow one to predict the consequence of any future abnormal heat load upon a given estuary.

Note: Although the following objectives are not of primary concern for immediate justification of the Patuxent River Estuary Studies, they are of sufficient importance in a subsidiary status to justify their inclusion at this time.

7. To develop an annotated bibliography concerning effects of elevated temperatures upon aquatic poikilotherms and water quality.

8. To develop an annotated check list of estuarine species found within the Patuxent River Estuary.
9. To develop distribution maps of aquatic species found within the Patuxent River Estuary.
10. To develop illustrated taxonomic keys to the species found within the Patuxent River Estuary (objective #10 to be achieved only through special attention and cooperation with a number of Natural Resources Institute [N.R.I.] staff members).

REASONS FOR UNDERTAKING STUDY AND RELATION TO PREVIOUS WORK: The principal reason for undertaking the study is to allow for as complete an evaluation of the effects of increased heat loads upon Patuxent River estuary ecology as is possible. (Relation to previous work, etc., has already been discussed in previous passages.)

NOTE: In the following section on procedure, it can be observed the investigation proceeds from considerations of the physical-chemical environments to various trophic levels with in the biological community. Although it is realized that many of our biological techniques leave much to be desired, we are pressured for time and the techniques and equipment employed appear to be the most practical and efficient available to us. In all instances, collecting gears and stations will be held consistent throughout the study period. The gear employed and the station locations appear to cover most of the habitat niches found in the study area. Data obtained will reveal species diversity indexes, a pollution study objective utilized to advantage by some pollution investigators. In addition, our study, because of the continued collecting pattern and the constancy of collecting gear used should allow for evaluation of seasonal changes of various populations and, in certain areas of investigation, allow for presentation of standing crop data.

PROCEDURE: I. Hydrography (Chesapeake Bay Institute):

(A) Chesapeake Bay Institute is conducting dye studies with rhodomine B in order to determine the extent of tidal transport, flushing rates and probable future distribution of heated water.

Calculations based upon dye distribution under low flow conditions show that the following temperature relationships can be expected after steady state conditions have been reached (Dr. Pritchard, personal communication):

Distance from plant effluent in yards	°F above normal one 335MW unit in operation	°F above normal two 335 unites in operation
1000	7.2 - 8.4	14.4 - 16.8
2000	5.5 - 7.3	11.0 - 14.6
*3000	4.4 - 6.7	8.8 - 13.4
4000	3.5 - 5.6	7.0 - 11.2
5000	2.6 - 4.7	5.2 - 9.4
6000	2.0 - 3.6	4.0 - 7.2
8000	1.0 - 1.9	2.0 - 3.8
10000	0.6 - 1.1	1.2 - 2.2

*plant intake located about 3000 yds. downstream from effluent.

It is assumed the total caloric release of the plant will be distributed uniformly in four feet of surface water. The above temperature pattern will exist in an upstream direction during a flooding tide and in a downstream direction during the ebbing tide.

Beaven (1960) showed a maximum surface temperature at Solomons of 31° C (87.8° F) with peaks between 29° C (84.2° F) and 30° C (86.0° F) commonly occurring during July and August. Surface water temperatures in the study area should reach similar peak levels during July or August. Since extreme environmental conditions are of prime importance with living systems and since high temperatures are known to be lethal to living systems, we will concern ourselves with anticipated peak temperatures at various distances from the effluent area. Based upon Dr. Pritchard's calculations and assuming a surface water temperature of 85° F (29.5° C) the following temperature relationships may be expected:

Distance from effluent in yards	°F one 335MW unit in operation	°F two 335MW unit in operation
0	100.9 - 103.2	105.3 - 109.9
1000	92.2 - 93.4	99.4 - 101.8
2000	90.5 - 92.3	96.0 - 99.6
3000	89.4 - 91.7	93.8 - 98.4
4000	88.5 - 90.6	92.0 - 96.2
5000	87.6 - 89.7	90.2 - 94.4
6000	87.0 - 88.6	89.0 - 92.2
8000	86.0 - 86.9	88.0 - 88.8
10000	85.6 - 86.1	86.2 - 87.2

(see also map, Page 10)

Although plant designs call for a 11.5° F temperature differential across the condensers during summer months, recirculation is expected to cause areas in the river to reach temperatures about 25° F above normal river temperatures.

(B) As an aid to development of a visual concept of the Patuxent River estuary, interim project leader Dr. F. J. Schwartz has made detailed depth profile measurements with an Edo depth recorder and constructed a model of the estuary. The model, which is 9 feet in height, extends from Deep Landing to Queen Tree Landing.

II. Hydrology (U.S. Geological Survey):*

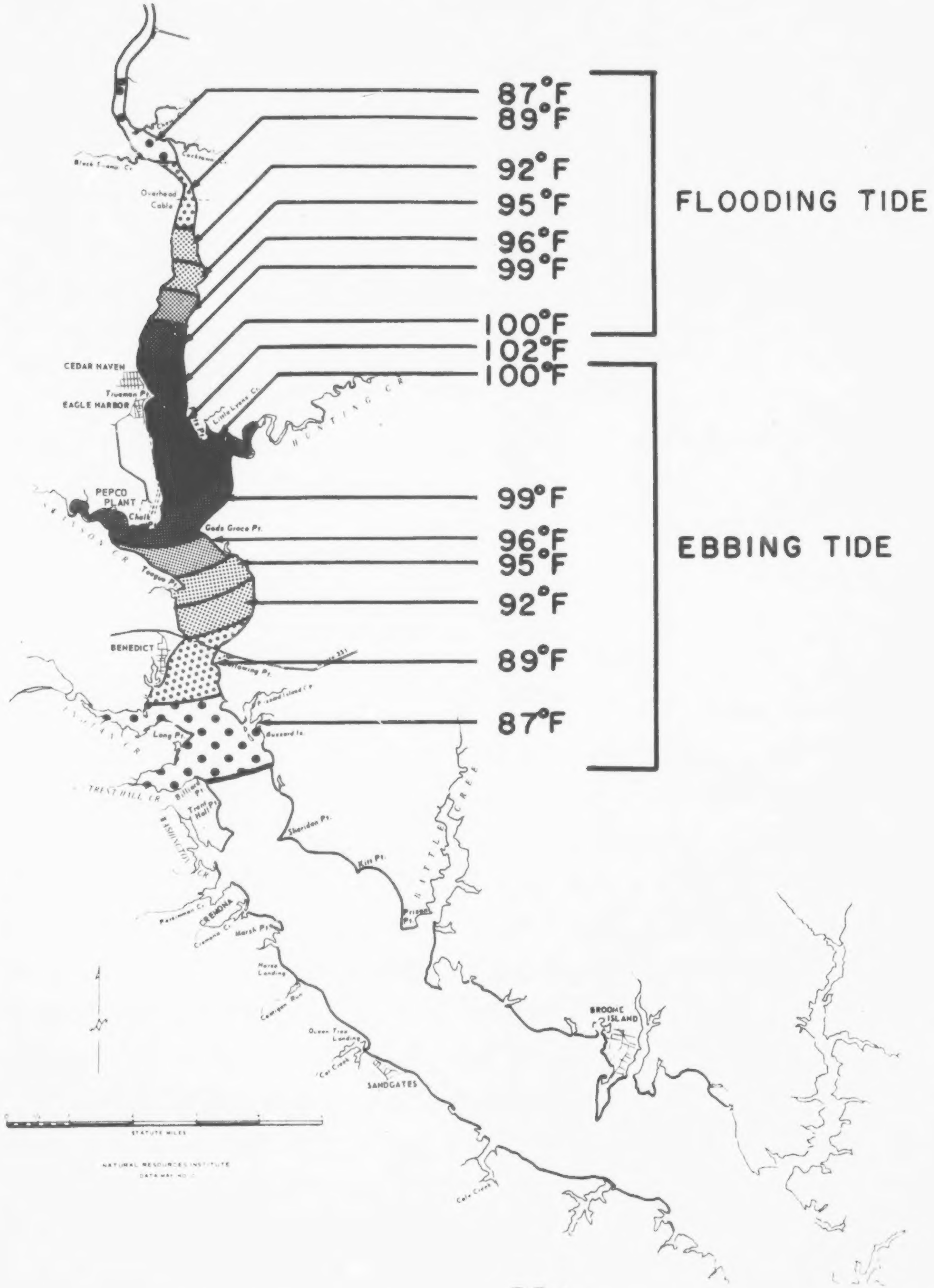
A hydrologic study of the lower Patuxent River watershed is to be conducted by the United States Geological Survey (U.S.G.S.). The primary aim of the investigation is to prepare a total freshwater input budget for the river area extending from Lyons Wharf Road at the northwest boundary of Calvert County, downstream to Solomons, a distance of about 42 miles.

Such information is valuable for proper interpretation of obtained water quality information, viz., turbidities, salinities, temperatures, etc.

III. Water Quality:

Although temperature is of prime concern in the Patuxent Study, it is necessary to obtain additional data on other water quality variables. These data are important not only to describe the environment occupied by the organisms under consideration

*At the time of writing this project was still pending.


87°F
89°F
92°F
95°F
96°F
99°F
100°F
102°F
100°F
FLOODING TIDE
99°F
96°F
95°F
92°F
89°F
87°F
EBBING TIDE
Black Swamp Cr.
Cocktown Cr.
Overhead Cable
CEDAR HAVEN
Trueman Pt.
EAGLE HARBOR
Little Lyons Cr.
HUNTING CR.
PEPCO PLANT
Chalk Pt.
Gods Grace Pt.
Teague Pt.
BENEDICT
Hallowing Pt.
Long Pt.
Buzzard Is.
TRENT HALL CR.
Billiard Pt.
Trent Hall Pt.
Sheridan Pt.
Kitt Pt.
Prison Pt.
BATTLE CREEK
Persimmon Cr.
CREMONA
Cremona Cr.
Marsh Pt.
Horse Landing
Cremona Run
Ocean Tree Landing
Cat Creek
SANDGATES
BROOME ISLAND
Cole Creek
N
0
1
2
3
4
5
STATUTE MILES
NATURAL RESOURCES INSTITUTE
DATA MAP NO. 2

C. Modified Forster Anchor Dredge Program (Hallowing Pt. Station):

The anchor dredge program is chiefly concerned with smaller macroinvertebrates which are not adequately sampled with the hydraulic dredge.

Material obtained is handled according to the technique described by Sanders (195 1960). Since the anchor dredge secures an intact portion of the substrate it lends itself to detailed correlations between sediment and species composition. This latter aspect is a cooperative endeavor between Hallowing Point and Dr. Biggs (marine geologist) of the Shellfish Department, Solomons.

Anchor dredge stations are located at the 5-foot contour level on either shoreline and at all available 10-foot contour levels in a transect locality at the following stations:

1. Lower Marlboro
2. Cocktown Creek
3. Deep Landing
4. Trueman Point
5. Potts Point
6. Chalk Point
7. Teague Point
8. Benedict Bridge
9. Long Point
10. Sheridan Point
11. Queen Tree Landing
12. Broome Island

In order to coincide with hydraulic dredge work, the Forster dredge sampling is carried out at quarterly intervals except for certain key stations where monthly samples are taken to allow for a closer examination of seasonal changes within the benthic community.

D. Suspended Basket-Substrate Study (Hallowing Point):

In order to overcome the problem in variation of sampling device employed, variation of substrate, etc.,a technique using basket-trays lined with 1/8th inch plastic screening and containing a uniform substrate of oyster shells is used to collect unattached invertebrates and vertebrates which are commonly associated with oyster shell heap communities. Of special interest is abundant *Gammarus* sp. in estuary. Tray examination is monthly at the following stations:

1. Lower Marlboro - (West)
2. Deep Landing - (East and West)

3. Trueman Point - (East and West)
4. Potts Point - (East and West)
5. Chalk Point - (East and West)
6. Teague Point - (East and West)
7. Benedict Bridge - (East, Middle and West)
8. Long Point (East and West)
9. Sheridan Point - (East and West)
10. Queen Tree Landing - (East and West
11. Broome Island - (East)

E. Mya Program (Shellfish Department, N.R.I.):

A life history study of Mya arenaria has been underway in the Patuxent River for a number of years and is being continued. Investigations include considerations on distribution, growth and mortality, condition factor and spawning activities.

F. Oyster Program (Shellfish Department, N.R.I.):

In order to measure seasonal index of condition of oysters held on trays, stations have been located at the following locations:

1. Teague Point
2. Benedict Bridge
3. Cremona

An additional oyster program is designed to record rate of growth and mortality of oyster stocks which are held on trays at the following localities:

1. Potts Point West
2. Teague Point
3. Benedict Bridge
4. Cremona
5. Solomons Island

G. Crab Dredge Program (Shellfish Department, N.R.I. and Hallowing Point):

A midwinter sampling period for the purpose of determining relative abundance and distribution of the blue crab within the Patuxent River Estuary has been developed. Stations are located at the Following channel localities:

1. Lower Marlboro
2. Cocktown Creek
3. Deep Landing
4. Trueman Point
5. Potts Point
6. Chalk Point
7. Teague Point
8. Benedict Bridge
9. Long Point
10. Sheridan Point
11. Queen Tree Landing
12. Broome Island
13. St. Leonard Creek
14. Half Pone Point

Due to the difficulty in obtaining adequate samples during warmer weather with the crab dredge, information of crab distribution during these periods will be obtaine routinely from other types of sampling that will be carried out throughout the year, viz., dredging and trawling.

VII. Fish:

A. Fish Egg and Larvae Program (Finfish Department, N.R.I.):

As part of an extensive fish egg and larvae study extending into Chesapeake Bay, seven stations have been established within the Patuxent River area. Weekly samples are obtained with towed meter nets at surface, mid-depth and bottom levels. Channel stations which are located in the Patuxent study area are as follows:

1. Lower Marlboro
2. Deep Landing North
3. Chalk Point
4. Teague Point
5. Long Point
6. Queen Tree Landing
7. Broome Island

B. Juvenile Striped Bass Program (Finfish Department, N.R.I.):

As part of a Chesapeake Bay-wide juvenile striped bass investigation, five 30-ft. deepwater trawl collecting stations have been established at the following Patuxent River localities:

1. Trueman Point
2. Teague Point
3. Long Point
4. Sheridan Point
5. Queen Tree Landing

C. Shore Seine Fish Program (Hallowing Point St.):

A quarterly shoreline seining program (fifty-foot seine) presently occupies the following East and West shore stations:

1. Cocktown Creek
2. Deep Landing
3. Trueman Point
4. Potts Point
5. Chalk Point
6. Teague Point
7. Benedict Bridge
8. Long Point
9. Sheridan Point
10. Queen Tree Landing
11. Broome Island

D. Shallow Water Trawl Program - (Hallowing Point St.):

Monthly 10 ft. fixed beam trawl stations have been established at the same general localities as occupied by the shore seine program. Trawls are made within the 10-ft. contour level.

E. Deep Water Trawl Program (Hallowing Point St.):

Quarterly 40-ft. deepwater trawl stations have been established at midchannel localities, located between adjacent shore seine, and shallow water trawl stations.

F. Fish Tagging Program (Hallowing Point St. and U. S. Fish & Wildlife Serv

A tagging program is underway which is concentrating on four relatively abundant species within the Patuxent River Study area; (1) White Perch (*Roccus americanus*); (2) Striped Bass (*Roccus saxatilus*); (3) White Catfish (*Ictalurus catus*) and hogchoker (*Trinectes maculatus*). Petersen disk and torus tags are being employed. Of additional interest is a shore fish-marking program which will attempt to investigate whether local back-bay and cove small fish species populations are endemic to such areas.

G. Creel Census Program (Finfish Dept., N.R.I.):

A creel census program which involves fishermen counts and fishermen interviews for catch information is being conducted on the Patuxent River between the Overhead Cable line and the Queen Tree Landing area.

General note on fish population analysis: Data obtained at each station will include species composition, numbers and length frequencies. Certain species will receive added attention concerning their life history because of one or more of the following reasons:

1. availability of past published data on species within Patuxent
2. abundance in estuary

3. extreme thermal tolerance or intolerance
4. anadromous movement through estuary

VIII. Wildfowl Study (Maryland Game and Inland Fish Commission and U.S. Fish and Wildlife Service):

An aerial wildfowl census program is being conducted on the Patuxent fron Nottingham to Broomes Island. The study involves enumeration of wildfowl species, numbers and distribution on a bi-weekly schedule between October 15 to March 15.

IX. Macro-Vegetation Program (Botany Department, University of Maryland):

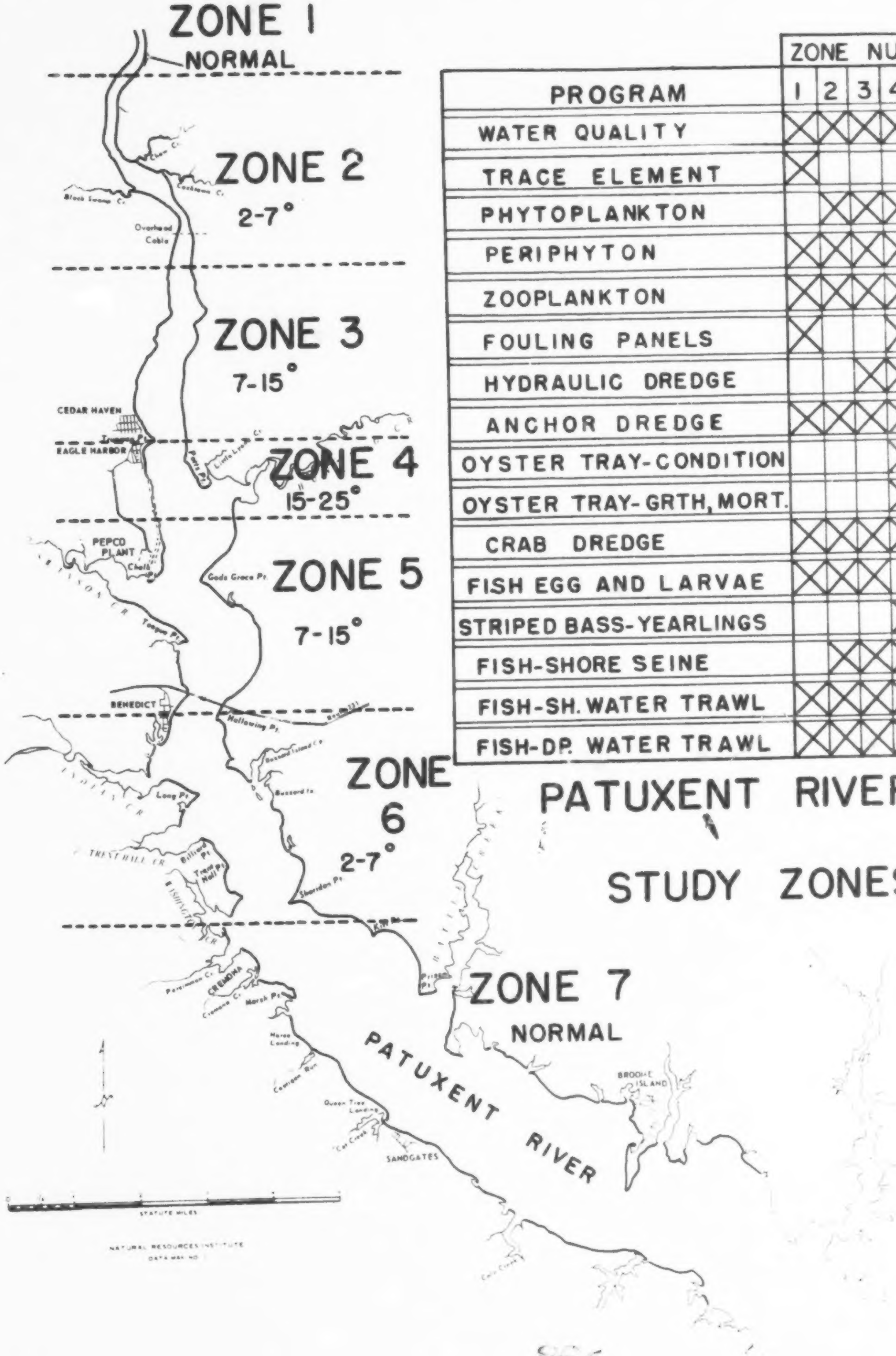
A floristic study on all seed plants and macroscopic algae is being undei taken during the summer period. Transect collections are being made at localities coi ciding with the other biological investigations within the study area between Lower Marlboro and Broome Island. Of primary concern is species composition and dates of flowering.

Summary of Sampling Approach and Comments on Data Analysis:

Sampling covers a variety of habitats (see map and table on page 24 for simplified presentation of sample zones and activities) throughout the year and incluc most groups of organisms found in the study area. Certain programs should provide productivity and standing crop values while others will only give information on relative abundance. As a consequence of the overall program, however, information on species composition, distribution and seasonal abundance should be forthcoming. In addition, the data should also allow for considerations of thermal requirements as delineated by Brett (1959). Extreme temperature changes, if they occur, should produce radical population changes which should be clearly revealed in data comparisons.

Intermediate thermal influences may be elicited in parts of the river system remote from the area of maximum effect. Such changes may result in differential metabolic activities which will be revealed through condition factor studies.

Potentially, the most thermally sensitive aspect of the life cycle concerns


ZONE 1
NORMAL
ZONE 2
2-7°
ZONE 3
7-15°
ZONE 4
15-25°
ZONE 5
7-15°
ZONE 6
2-7°
ZONE 7
NORMAL
Black Swamp Cr.
Overhead Cable
CEDAR HAVEN
EAGLE HARBOR
PEPCO PLANT
Chalk Pt.
Gods Grace Pt.
BENEDICT
Hallowing Pt.
Buzzard Island Cr.
Buzzard Is.
Long Pt.
TRENT HALL CR.
Trent Hall Pt.
Sheridan Pt.
Prison Pt.
Persimmon Cr.
CREMONA
Cremona Cr.
Marsh Pt.
Hoke Landing
Queen Tree Landing
Cat Creek
SANDGATES
BROOME ISLAND
PATUXENT RIVER
STATUTE MILES
NATURAL RESOURCES INSTITUTE
DATA MAP NO.

PROGRAM	1	2	3	4	5	6	7
	ZONE NUMBERS						
WATER QUALITY	☒	☒	☒	☒	☒	☒	☒
TRACE ELEMENT	☒				☒		☒
PHYTOPLANKTON		☒	☒	☒	☒	☒	☒
PERIPHYTON	☒	☒	☒	☒	☒	☒	☒
ZOOPLANKTON	☒	☒	☒	☒	☒	☒	☒
FOULING PANELS	☒			☒	☒		☒
HYDRAULIC DREDGE			☒	☒	☒	☒	☒
ANCHOR DREDGE	☒	☒	☒	☒	☒	☒	☒
OYSTER TRAY-CONDITION				☒	☒		☒
OYSTER TRAY-GRTH, MORT.				☒	☒	☒	☒
CRAB DREDGE	☒	☒	☒	☒	☒	☒	☒
FISH EGG AND LARVAE	☒	☒	☒		☒	☒	☒
STRIPED BASS-YEARLINGS				☒	☒	☒	☒
FISH-SHORE SEINE		☒	☒	☒	☒	☒	☒
FISH-SH. WATER TRAWL	☒	☒	☒	☒	☒	☒	☒
FISH-DP. WATER TRAWL	☒	☒	☒	☒	☒	☒	☒

PATUXENT RIVER

STUDY ZONES

reproductive success. If any radical reproductive alterations occur, a number of programs are designed to sense these changes immediately, notably the anchor dredge and fish egg and larvae studies.

Contacts have been made with the University of Maryland Computer Laboratory and an attempt will be made to develop a program whereby the computer laboratory facilities can aid in data analysis.

COOPERATING AGENCIES AND THEIR FUNCTIONS: Procedural discussions have already included names of the cooperating agencies and descriptions of their functions. The following list briefly repeats this same information:

I. Chesapeake Bay Institute: Hydrographic studies on flushing rates, tidal transport and future temperature distribution.

II. U. S. Geological Survey:

A. Hydrologic studies on total fresh water input and evapotranspiration.

B. Geological studies on attachment of fouling organisms with the use of suspended substrates.

C. Water quality studies with the use of automatic instrumentation.

D. Trace element studies.

III. State of Maryland, Department of Geology and Mines:

A. Trace element study.

IV. University of Maryland, Zoology Department:

A. Phytoplankton studies using C_{14} uptake and chlorophyll analysis to determine productivity rates and to arrive at standing crop estimates.

V. University of Maryland, Botany Department:

A. Floristic studies on all seed plants and macroscopic algae.

VI. State of Maryland Water Pollution Control Commission:

A. Water quality studies including bacteriological considerations of *E. coli* and coliform organisms.

VII. Marine Science Center, Lehigh University:

A. Zooplankton studies

VIII. State of Maryland Game and Inland Fish Commission:

- A. Wildfowl Studies

IX. U. S. Fish and Wildlife Service:

- A. Striped bass tagging studies.

X. Natural Resources Insitutte, Solomons Laboratory:

- A. Finfish Department -
  1. Fish egg and larval studies.
  2. Striped bass studies concerning location of young-of-the-year populations.
  3. Creel census.
- B. Shellfish Department
  1. Benthic studies concerning relationships between species distribution and sediment characteristics.
  2. Hydraulic dredge studies concerning larger shellfish populations, viz., *Mya* life history.
  3. Oyster tray studies concerning oyster mortality, condition factor and gonad maturation.

XI. Natural Resources Institute, Hallowing Pt. Field St.:

- A. Water quality studies with the use of automatic instrumentation.
- B. Periphyton studies to determine species composition and distribution.
- C. Zooplankton studies.
- D. Benthic studies using the hydraulic and anchor dredge.
- E. Ichthyofauna studies using shore seining, shallow water and deep water trawling.
- F. Fish tagging studies.

but also to establish whether or not temperature is the only parameter changing during the study period. Obviously certain chemical changes may occur that are the result of an increased heat load. Photosynthetic-respiration rates may be altered and coupled with decreased gas solubility in water at higher temperatures, dissolved oxygen relationships may be greatly altered.

Depending upon the rapidity of suburban development in the upper watershed, excessive organic loading may complicate data interpretation. Consequently, continued information on upstream dissolved oxygen concentrations, B.O.D. levels, coliform counts, nutrients, turbidities, etc., are necessary to properly evaluate these potential upstream influences upon the study area.

A. Maryland Water Pollution Control Commission (W.P.C.C.) Sampling: at 15 transect localities. Determinations made are as follows:

1. Suspended solids
2. Dissolved solids
3. Total solids
4. Turbidity
5. Color
6. Coliform
7. *E. coli*
8. Temp.
9. Dissolved oxygen
10. B.O.D.
11. Free CO_2
12. Total acidity
13. pH
14. Conductivity
15. Chloride
16. Ammonia nitrogen
17. Organic nitrogen
18. Nitrite nitrogen
19. Nitrate nitrogen
20. Total Keldahl nitrogen
21. Phosphate phosphorus
22. Orthophosphate

At selected intervals, 24-hour runs were made at Pott's Point transect station (Pepco discharge) and at Benedict Bridge in order to determine diurnal fluctuations of certain water quality parameters.

Present water quality transect stations are located as follows:

1. Lower Marlboro
2. Cocktown Creek
3. 1500 yds, downstream from Cocktown Creek
4. Deep Landing
5. 1200 yds. downstream from Deep Landing
6. Trueman Point
7. Potts Point
8. 1200 Yds. downstream from Potts Point
9. Chalk Point
10. Teague Point
11. Benedict Bridge

12. Long Point
13. Sheridan Point
14. Queen Tree Landing
15. Broome Island

(See Map Page 13 for water quality stations)

Future work by the W.P.C.C. will attempt a monthly schedule during the summer months. Due to facility limitations, nutrient determinations will be limited to the following transect stations:

1. Lower Marlboro
2. Deep Landing
3. Potts Point
4. Benedict Bridge
5. Sheridan Point
6. Queen Tree Landing

Samples are to be taken at a given transect locality at the same surface, mid-depth and bottom stations as occupied during regular water quality runs. Samples from a given transect locality are to be composited and determinations made from an aliquot.

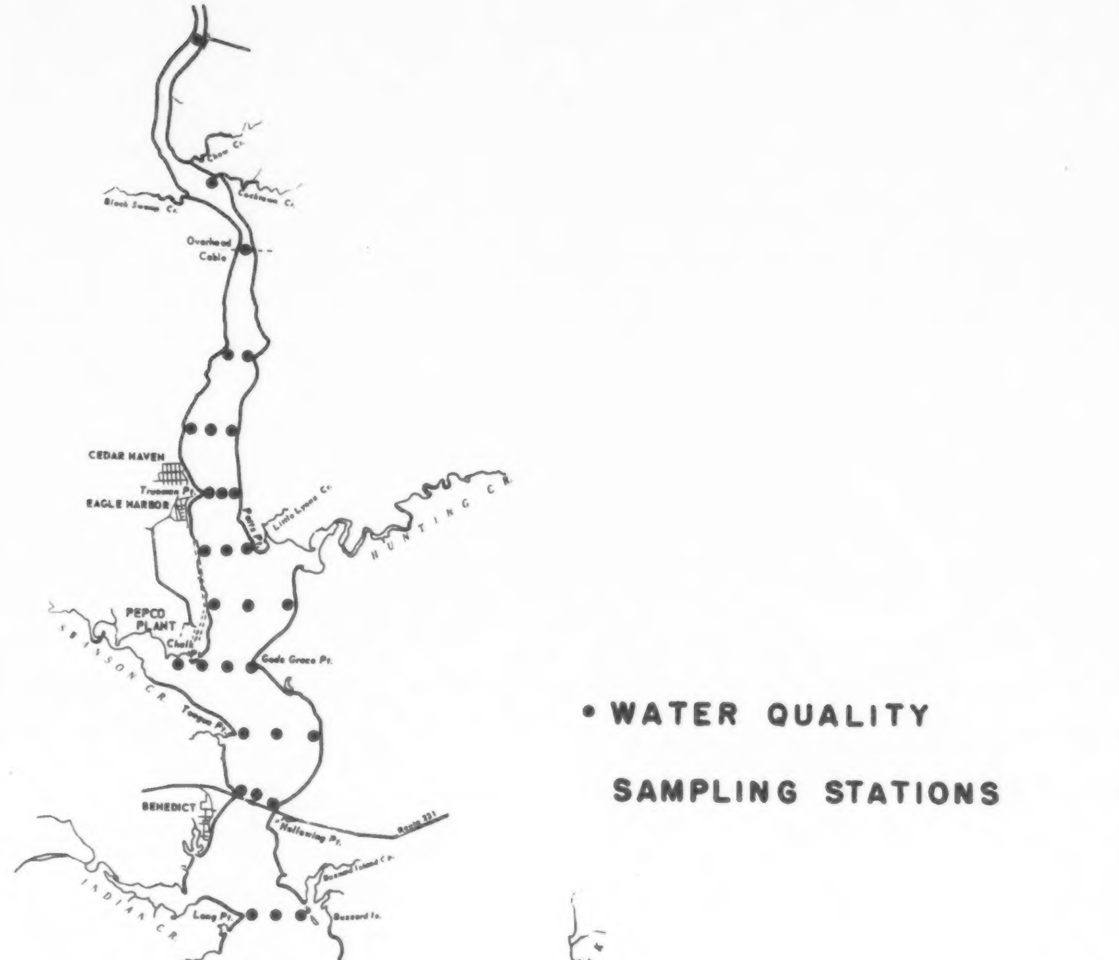
Information on the above listed nutrients are valuable in two respects: (1) to give information on upstream influences, especially domestic sewage and/or terrestrial fertilization, (2) reflect changes in nitrogen content which may occur if excessive growths of nitrogen fixing blue-green algae develop.

B. W.P.C.C., U.S.G.S. - Hallowing Pt. Station Cooperative Sampling Program:

Additional monthly profile information is to be obtained on temperature, dissolved oxygen and conductivity at the following transect localities:

1. Deep Landing
2. Trueman Point
3. Potts Point
4. Chalk Point
5. Benedict Bridge
6. Sheridan Point

Instrumentation is employed in order to allow for development of detailed latitudinal depth profile presentations of temperature, dissolved oxygen and conductivities. Instruments are available for temperature and conductivity recordings and therefore present no problem to the survey aims. Oxygen instrumentation, however, is an uncertainty. A modified Winkler technique as developed by Dr. Carpenter of



Cacoon Cr.
Cockroom Cr.
Black Swamp Cr.
Overhead Cable
CEDAR HAVEN
Trueman Pt.
EAGLE HARBOR
Ferry Pt.
Little Lyons Cr.
HUNTING CR.
PEPCO PLANT
Chalk Pt.
SWANSON CR.
Gods Grace Pt.
Teagues Pt.
BENEDICT
Hallowing Pt.
Route 231
Buzzard Island Cr.
Buzzard Is.
INDIAN CR.
Long Pt.
TRENT HALL CR.
Billings Pt.
Trent Hall Pt.
WASHINGTON CR.
Sheridan Pt.
Kitts Pt.
Prison Pt.
BATTLE CREEK
PATUXENT RIVER
Persimmon Cr.
CREMONA
Cremona Cr.
Marsh Pt.
Horse Landing
Cadogan Run
Queen Tree Landing
Cat Creek
SANDGATES
BROOME ISLAND
Cole Creek
N
0 ½ 1 2 3 4 5
STATUTE MILES
NATURAL RESOURCES INSTITUTE
DATA MAP NO. 2

● WATER QUALITY SAMPLING STATIONS

C.B.I. is being employed until an oxygen electrode system is deemed worthwhile to incorporate into our procedures.

Certain details of the monthly cooperative program are still open to discussion. It is felt sampling should occur in reference to a certain constant stage of the tidal cycle as developed by Swain and Newman (1962) and as utilized by Dr. Kaplovsky in his studies on Delaware Bay and estuary. Another approach is to occupy a series of stations for a 24-hour sampling period as done by Glenn (1961). The latter traced a longitudinally oscillating slug of low oxygen water in the tidal Arthur Kill and East Rivers of New York. Since the mass of maximally heated water can be expected to oscillate in a similar manner within the Patuxent, serious consideration should be made of this technique.

The need for detailed profiles is important in order to (1) properly delineate the heated mass of water within the estuary; (2) locate exact zones of low oxygen content; and (3) establish the presence or absence of a salinity gradient. The above information, coupled with the regular water quality data, is essential as background information in relation to pelagic and benthis populations. It is also necessary to determine whether a plug of heated water exists which may act as a barrier to anadromo fish species.

C. Continuous temperature recordings (Hallowing Pt., U.S.G.S. and Shellfish Dept., N.R.I.):

In order to provide continual temperature data at key biological sampling stations, continuous temperature recorders are to be located at the following stations

1. Lower Marlboro - (E)
2. Deep Landing - (E & W)
3. Trueman Point - (E & W)
4. Potts Point - (E & W)
5. Chalk Point - (E & W)
6. Benedict Bridge - (E, M & W)
7. Sheridan Point - (W - Cremona)
8. Queen Tree Landing - (W)
9. Solomons

E = East Shore
M = Mid-channel
W = West Shore

Thermographs are presently in place at Lower Marlboro, Potts Point West, Chalk Point West, Benedict Bridge (Mid-channel, 3 depths), Queen Tree Landing and Solomons.

It is felt that during the "before" S.E.S. operation period, temperature gradients within the estuary will be reasonably smooth and interpolation can be made between presently existing thermograph stations. After commencement of S.E.S. operations a significant change in temperature distribution pattern is expected. It is during the "after" period that the full complement of thermograph stations will be established if funds will allow.

D. Continuous Water Quality Data Collection System - (U.S.G.S. and Hallowing Point Station):

A Honeywell automatic analog recording system is scheduled to be in operation on Benedict Bridge by early September. The system has the capacity for continuously recording the following parameters on a single linear strip chart:

1. Tide stage
2. Conductivity
3. Turbidity
4. Dissolved oxygen
5. Water temperature
6. Sunlight intensity
7. Wind direction
8. Wind velocity

E. Trace Element Study (Md. Dept. Geology, Mines and Water Resources & U.S.G.S.):

This cooperative project is scheduled to begin in mid-summer 1963.

Present plans include:

1. Weekly collection, over a twelve-month period, of composite samples at six locations in the Patuxent watershed:
   a. Solomons Island
   b. Benedict
   c. Hardesty (the primary reference station)
   d. Lyons Creek
   e. Laurel Gaughing Station
   f. Fort George G. Meade Gauging Station

2. Once each month, these samples would receive analysis for -

SiO_2
Al
Fe
Mn
Cu
Zn
P as PO_4
B
Ca
Mg
Na
K
HCO_3
CO_3
SO_4
Cl
F
NO_3
Dissolved solids
Hardness
Noncarbonate hardness
Alkalinity as $CaCO_3$
Specific conductance
pH
Color

3. Other weekly samples (40 weeks) would receive analysis for -

SiO_2
Fe
Mn
Ca
Mg
Na+K (calculated)
HCO_3
CO_3
SO_4
Cl
F
NO_3
Dissolved solids
Hardness
Noncarbonate hardness
Alkalinity as $CaCO_3$
Specific conductance
pH

4. Once each month, a supplementary sample from the primary reference station, representing the fresh water out-put of the watershed, would also be subjected to spectographic analysis providing data on-

Al
B
Ba
Be
Cr
Co
Cu
Fe
La
Pb
Li
Mn
Mo
Ni
P
Rb
Sc
Ag
Sr
Sn
Ti
V
Yb
Y
Zn
Zr

IV. Microorganisms:

A. Phytoplankton (Zoology Dept., Univ. of Maryland):

In order to obtain information on primary production and standing crops, this program involves the use of C_{14} uptake and chlorophyll extraction techniques. Stations are located at the following transect localities:

1. Cocktown Creek
2. Deep Landing
3. Trueman Point
4. Potts Point
5. Chalk Point
6. Benedict Bridge (South)
7. Long Point
8. Sheridan Point
9. Queen Tree Landing
10. Broome Island
11. Battle Creek
12. Half Pone Point

B. Periphyton: (Hallowing Point):

Due to the presence of suitable substrate formed by extensive beds of rooted aquatic plants in the estuary, especially from the vicinity of Teague Point-Benedict Bridge south, the attached microbial community must play a significant role in the aquatic food chain of the Patuxent River.

A study of the periphyton or "Aufwauchs" community is being conducted by means of suspended microscope slides. The slide holders are submersed just under the water surface. One set of slides is removed after one-week exposures and are utilized for direct microscope examination. The remaining slides are exposed for a month interval and analyzed for chlorophyll content and organic carbon. Stations are presently located at the following localities:

1. Lower Marlboro
2. Deep Landing
3. Trueman Point
4. Potts Point West
5. Chalk Point
6. Benedict Bridge
7. Sheridan Pt. West (Cremona)
8. Queen Tree Landing
9. Broome Island
10. Solomons Island

V. Zooplankton (Hallowing Point Station & Marine Science Center, Lehigh Univ.)

A bi-weekly sampling program is underway using 5-minute oblique tows with a half meter, #2 net at bottom, mid-depth and surface levels. Samples are split and examined for volume, organic carbon and species composition. Station locations are as follows:

1. Lower Marlboro
2. Overhead cable line
3. Trueman Point-Potts Point
4. Chalk Point
5. Benedict Bridge
6. Sheridan Point
7. Queen Tree Landing
8. Broome Island
9. Hellen's Creek

A midsummer and midwinter 24-hour zooplankton sampling program is planned in order to disclose any diurnal vertical migration. Of prime concern is influence of anticipated thermal stratification upon zooplankton movement towards surface waters. Assuming a two-layered system and the apparent cyclic (i.e., vertical migration and horizontal tidal displacement) zooplankton movements necessary for maintenance of populations within estuaries, a demonstration of heated water alterations of cyclic movements would be helpful in interpreting any zooplankton changes.

VI. Macroinvertebrates

A. Fouling project (U.S.G.S.):

This project is concerned with attachment of macroorganisms to suspende plates. Exposure times are of one, three and twelve-month durations. Stations are located at:

1. Lower Marlboro
2. Potts Point West
3. Chalk Point
4. Benedict Bridge West
5. Benedict Bridge Channel (3 depths)
6. Queen Tree Landing
7. Solomons Island

Material collected is examined for species composition, quantity, wet weight, dry weight and organic carbon.

B. Hydraulic Dredge Program (Shellfish Department, N.R.I., and Hallowing Point Station):

To determine the species composition, abundance and distribution of the larger benthic organisms of the estuary a hydraulic dredge sampling program has been established at quarterly sampling intervals. Stations presently occupied are as follow

1. Trueman Point - (West) *
2. Potts Point (Pepco discharge) - (East and West) *
3. Chalk Point - (East and West) *
4. Teague Point - (East and West)*
5. Benedict Bridge - (East and West)*
6. Long Point - (East and West)*
7. Trent Hall Point - (East and West)*
8. Sheridan Point - (East and West) *
9. Marsh Point - (East and West)
10. Prison Point - (East)
11. Queen Tree Landing - (East and West) *
12. Broome Island - (East and West) *

Asterisked stations are to be continued. These localities coincide with all other aspects of the Patuxent investigation and have been selected with respect to anticipated temperature distribution. Due to the relative stability of the larger benthic organisms it is felt a quarterly sampling interval is quite adequate for obtaining desired information.

Note: Due to the ambitious nature of the overall program and the great number of people, boats, institutions and agencies involved, one of the most important problems is attainment of full cooperation and coordination throughout the investigation. It is therefore suggested that the Hallowing Point Laboratory be used as a central clearing house for general information on the Patuxent River Studies, especially for information on availability of boats, study specimens, and collecting schedules of various projects. Laboratory facilities are available to all cooperators and dormitory space is available when 24-hour studies, extended collecting operations, etc are taking place.

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STATEMENT

FOR

PUBLIC MEETING HELD BY U. S. DEPARTMENT OF INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
ORLANDO, FLORIDA
MARCH 12 and 13, 1968

My name is Harvey D. Mathis. I am Administrative Director of the International Paper Company Mill at Panama City, Florida. We appreciate the opportunity to appear at this Public Meeting and give our opinion on the optimum use and future development of estuarine resources.

In its Annual Report to Stockholders in 1966, International Paper Company stated its policy on Water and Air Management as follows:

> For the past several years there has been increasing public awareness of the need for improving the quality of air and water resources. This problem affects localities all over the country. The solutions which will be developed will involve every segment of our society, both public and private. Our Company has been working to develop the technology required to deal with its water-disposal problems. Our capital programs are designed to include the latest technological developments in equipment for improved air and water management. We are cooperating with various Federal, State and local authorities to identify problems, develop programs

and establish time schedules for workable solutions. A senior corporate officer has been appointed with responsibility for direction of this important work.

The Panama City Mill of International Paper Company was built in 1931 and consists of a pulp mill and two large paper machines. One machine produces unbleached linerboard; the other produces bleached machine dried pulp and unbleached board products. Total production is approximately 440,000 tons per year. The mill alone employs 1,050 people, not including a large number of supporting woodlands personnel. It is one of the largest employers in Bay County. Annual expenditures for payrolls are $9,300,000. Annual expenditures for raw materials and freight are $20,500,000.

The Mill uses approximately 32 million gallons of fresh water per day. After use, this process waste water is given primary treatment before being discharged into St. Andrews Bay. It is in a small part of the Eastern portion of the 18 square mile area between Dupont Bridge and Hathaway Bridge that our process discharge takes place. This 18 square mile area itself is only a small part of the large estuary of St. Andrews Bay. The area has depths ranging up to 60' and is subject to an average tide of 1.4', according to the Corps of U. S. Engineers. This affords a dispersal opportunity of great magnitude. International Paper Company installed the first paper mill waste clarifier in the State of Florida in 1952, after extensive tests, which were reviewed by Florida State Board of Health Bureau of Sanitary Engineering personnel. This giant unit, containing a 300 foot diameter rake, removes over 90% of the suspended solids contained in the total mill process waste water. Primary sludge is presently disposed of in lagoons. After the clarifying process, treated waste water is passed through a rotary screen for removal of most of the remaining floating material. It is then discharged through a 54 inch diameter outfall diffuser, 800 feet long, into the main channel of St. Andrews Bay. The diffuser ports, 14 in number, spread the waste over a large area, with the final waste being discharged approximately 30 feet below the water surface. Our cooling water is discharged separately to the bay.

Currently, we are spending approximately one half million dollars on an additional sludge disposal system. This system will concentrate and remove sludge from both our waste treatment clarifier and our demineralizer water treating plant. We have been making tidal water surveys in the area of our plant for 18 years. For the past several years, these surveys have been made monthly, and more recently, semi-monthly during the summer months. Copies of all reports regularly go to the State Board of Health. We believe a study of these reports will reveal that we have not materially affected the water of St. Andrews Bay.

The waters into which our process discharge enters are coastal waters and we believe such discharge should come within the purview and be governed by Section 170C-5.025 for the Rules of the Florida Air and Water Pollution Control Commission, as recently amended. These waters are and have been for many years used for a variety of purposes. Swimming, fishing, boating, water skiing, crabbing, shrimping, scallop gathering and scuba diving are commonplace in season in these waters.

Ocean-going vessels as well as intercoastal waterway traffic regularly make use of the waters. East of Dupont Bridge and within a relatively short distance of our Plant, the waters are classified by the Florida Air and Water Pollution Control Commission in Group II, and are a satisfactory and continuing source of some of the finest oysters in the world. All this is simply our way of saying that the estuaries of our country should be used for multiple purposes just as our vast timberlands are used for multiple purposes for the betterment of mankind.

As to the matter of control, it is our belief that the State Air and Water Pollution Control Commission is the proper agency for this exercise. We feel decisions in this area can best be determined by State Authorities.

INTERNATIONAL PAPER COMPANY
PANAMA CITY MILL

By H. D. Mathis
H. D. MATHIS
ADMINISTRATIVE DIRECTOR

8 March 1968

COMMENTS ON THE DEVELOPMENT AND USE OF FLORIDA'S ESTUARIES

Thepeople of Florida should, and I believe will, enthusiastically support the efforts of our nations' leaders in pollution control, development and optimum use of our estuarine waters. With it's abundance of estuaries it is recognized that the state of Florida stands to gain immensely from such a program in economic value as well as increased health and sanitary conditions.

The national estuarine pollution study should be completed as soon as possible and should include overall recommendations and general guidelines for the development and ultimate use of our nation's estuaries. The development and determination of best use should be under the control and responsibility of the State governments. State action, or developments, should be in general agreement with the study guidelines and, where feasible, should be in accordance with the desires and wishes of the local governments.

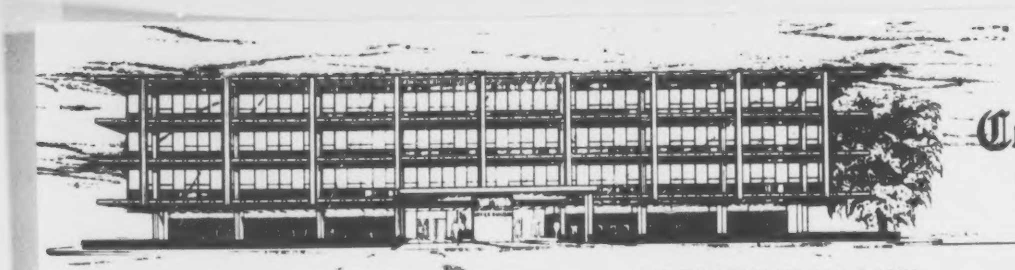
It is believed that the development goals for Florida's estuaries should be oriented, primarily, toward the fishing and tourist industries. Revenues from these sources alone would be considerable and should be used expressly toward development and maintenance cost.

Once the planning and development is completed strict rules and regulations should be adopted by the State for the protection and control of these valuable assets. Unfortunately, individual man for the most part will not accept the responsibility for the protection of our natural resources.

No doubt the cost of pollution control and proper development of Florida's estuaries will be tremendous. This cost should be borne by the federal, state and local governments and, perhaps, by private interest when a direct benefit is derived. Federal aid should be by grant, contigent upon the State's program meeting the requirements found necessary by the national study.

Mitchell J. Yelverton

Mitchell J. Yelverton
Mayor
West Panama City Beach, Fla.



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33902

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P. A. GERACI
DISTRICT TWO
KENNETH DANIELS
DISTRICT FOUR
D. T. FARABEE
CLERK
FRANK A. PAVESE
ATTORNEY
MRS. LAVON WISHER
ADMINISTRATIVE ASSISTANT

March 12, 1968

Director of Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control Administration
Athens, Georgia 30601

Dear Sir:

I regret that I am going to be unable to attend the Public Meeting to be held in Orlando on March 12-13, 1968 concerning the optimum use in the future development of our estuarine resources. I would therefore like to submit this letter as a brief statement of our position in Lee County concerning this vital problem.

Due to the peculiar geography of the State of Florida, we realize that conservation of estuarine resources is a vital necessity to our future growth of this area and to the State of Florida. Within the boundaries of Lee County, there are numerous streams and tributaries in addition to the Caloosahatchee River and the many bays and inlets along our Gulf Coast, so this Board of County Commissioners has for many years been aware of the vital problem of conserving and developing our natural water resources.

We have established, for several years, our own local Bulkhead Committee that is composed of our County Engineer, County Attorney as well as a Marine Biologist from the State Board of Conservation. The purpose of this Committee is to recommend Bulkhead lines which do not disturb and destroy the marine and plant life existing in the waters of our County. This Committee attempts to balance the public interest against the private interest and thereby, allowing proper development

GLADIOLA CAPITAL OF THE WORLD

by private interest while providing the proper protection for public interest. There has been a concerted effort between the local health department and the County Prosecutor to locate and prevent all discharge of raw sewerage into our rivers and bays.

The Central and Southern Florida Flood Control District has recently constructed a dam on the Caloosahatchee River which has contained a large body of fresh water, which has become a valuable estuarine resource. It is from this large body of fresh water that Lee County's new water system will draw its water resources and therefore, it is vital that this natural resource be preserved from pollution.

The brief foregoing sketch will give you a general idea of what steps have been taken in Lee County to preserve our estuarine resources and though I am unable to attend this meeting, please be assured that Lee County stands ready to cooperate with both State and Federal Agencies in programs that will protect these great natural resources from pollution and misuse.

If there is any further information you might need or want about Lee County, please feel free to call on us at anytime.

With kindest regards, I am

Sincerely yours,

Julian Hudson

FAP/jw

METROPOLITAN SOUTH BREVARD CHAMBER OF COMMERCE

Eau Gallie, South Brevard County, Florida

RESOLUTION

WHEREAS, the Clean Water Restoration Act of 1966 requires the Department of the Interior to make a study of pollution problems in the nation's estuaries; and

WHEREAS, the Florida State Board of Health has declared that water pollution in Florida is a health hazard and other state and local agencies have a direct interest in clean water management; and

WHEREAS, the urban center of South Brevard County is supported by shellfish, crustacea, and other seafood industry, sport fishing and boating, tourism and other forms of outdoor recreation; and

WHEREAS, the future of the general economy of the area is dependent on the optimum use and future development of estuarine resources;

THEREFORE, BE IT RESOLVED by the Metropolitan South Brevard Chamber of Commerce, representing a population of 110,000 people, that the Federal Water Pollution Control Administration is encouraged to support the recommendations and research needs presented by the Brevard County, Florida, Health Department; the Florida Insititute of Technology; and other organized interests of South Brevard in pollution control and estuarine water management,

AND, BE IT FURTHER RESOLVED that all agencies, organizations and interested parties be encouraged to support their federal, state, and local government agencies in this matter.

Adopted this 6th day of March 1968.

WD Webb
President

ATTEST:

Alfred D. Webster
Executive Director

Statement of Kenneth Thompson, President of Florida Shore and Beach Preservation Association for inclusion in the record of the National Estuarine Pollution Study meeting held in Orlando, March 12 and 13, 1968.

The Florida Shore and Beach Preservation Association was formed in 1957 as the State level counterpart of the American Shore and Beach Preservation Association. It is composed of representatives of local governments, organizations and individuals to provide a vehicle to unite their common interests to restore, enhance, preserve, and protect the State's beach resources and to assist in furthering the national program of the national organization.

Florida's ocean beaches and the shores of its countless lakes, bays and waterways constitute a priceless heritage to the citizens and visitors of the State. In the belief that this heritage must be protected and preserved, the Florida Shore and Beach Preservation Association has been created to unite efforts toward this end. In such a manner, the respective skills, information and experience of all interests, public and private, may most effectively be coordinated for planned research formulation of sound policy and legislation, and development of a broad educational program to enlist general public support for the restoration and preservation of Florida's valuable shores and beaches.

Florida has approximately thirteen hundred miles of general coastline, of which approximately eight hundred miles are sandy beaches. It is these sandy beaches that are the major concern of the Association for the reasons that they contribute greatly to the economic base of the State of Florida by providing the area for recreational use by residents and visitors to the State. The beach areas are also an impelling force for development of accommodations for the great tourist industry.

If the quality and quantity of the waters adjoining the beaches is not also preserved, much, if not all, of the value that beaches have will evaporate. It is essential, therefore, that the estuarine resources be preserved by proper safeguards and good management for their essential effect, among others, on preserving the usefulness and value of the beaches.

With regard to the role and relationship of Federal, State and local agencies, it is the opinion of the undersigned that the democratic process will be best served by having the role at Federal level of the setting of broad national standards, providing essential research functions, and cooperatively funding of programs and projects. The standards should be based on factors essential to national economy, defense, and broad considerations for the welfare of the nation.

States should have the role of policy setting and decision making affecting the welfare of the State, based on the national standards. It should have an important role in research and participating in the funding of programs and projects.

Local levels should be concerned with the specific problems of the local area, the identifying of local need for projects, the development of public interest and responsibility for raising the local share funds.

STATEMENT OF MARTIN R. NORTHRUP

Co-Chairman, Sanctuary Committee
Florida Audubon Society
2316 S. Hubert Ave.
Tampa, Florida 33609

For the National Estuarine Pollution Study Record
March 12-13, 1968
Park Plaza Hotel
Orlando, Florida

Submitted to:

Director,
Technical Programs,
Southeast Water Laboratory,
Federal Water Pollution Control Administration,
Athens, Georgia, 30601,

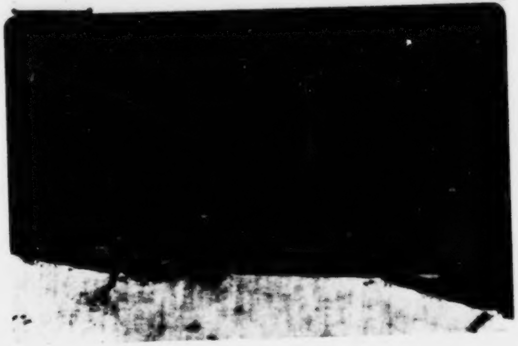
Gentlemen:

Biologists say estuarine bottomlands are the most productive areas on earth. Geologists say it took nature 20,000 years to create a marsh. Yet in a matter of days, drainage and fill and dredging can ruin them forever.

There can never again be fruitful spawning grounds at Ft. Lauderdale, or Lake Worth or upper Biscayne Bay, or Tampa Bay, or Boca Ciego. The south fork of the St. Lucie River at Palm City can never again be a clean, clear, deep river - once called by the late President Hoover the finest fishing in America. The grounds are sterile, the waters polluted, the silt-laden bottoms dead.

Marshes and baybottoms are a "factory" of basic animal and plant nutrients, contributing to the fabulous wealth of coastal waters that support our fish and shellfish resources... indeed they are the very essence of the chain of life. They are delicately-balanced complexes as fragile as an eggshell. Each acre is irreplaceable. And what we save now is all that ever will be saved....the rest is gone.

Attached is a photograph of "Whiskey Stump" in Tampa Bay. The photograph was taken with "infra-red" film. The green clorophyll of living plants stands out as red coloration.



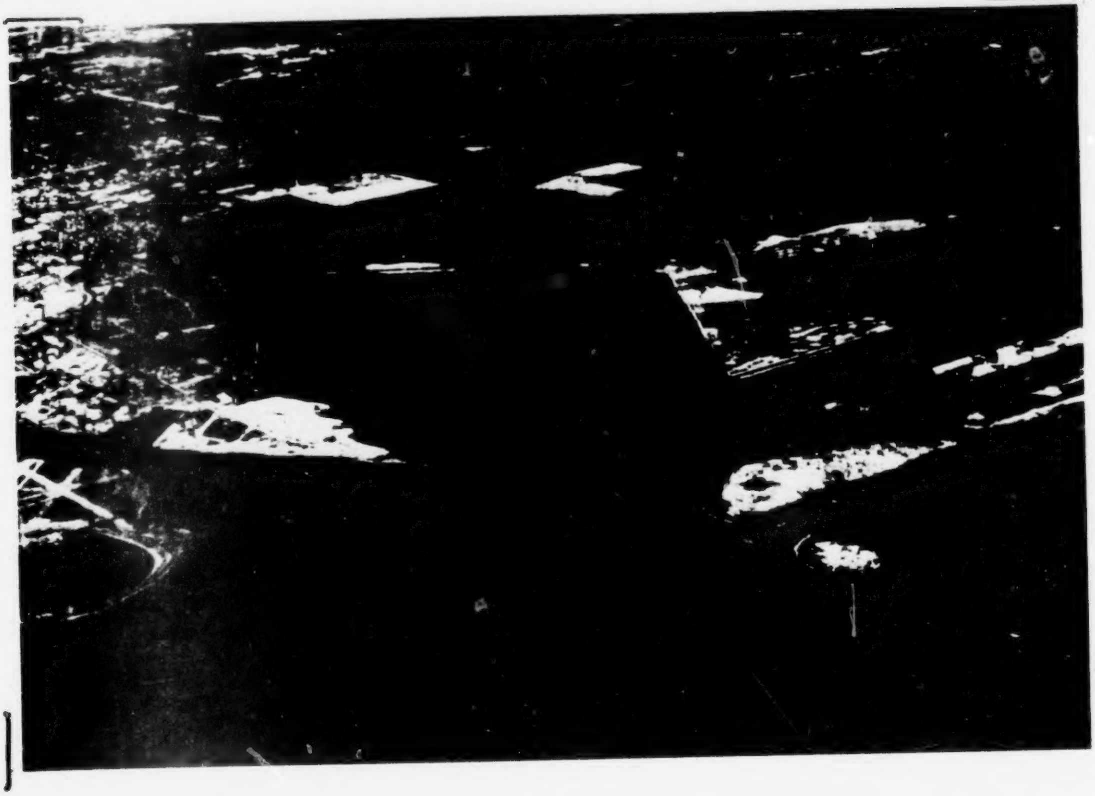
Area including "Whiskey Stump Key"
a National Audubon Society Sanctuary.

You will note the unusual contrast of deep black water compared to the yellow of shallows or above water sand. The large yellow area is a dredge and fill project. The red coloration indicates the mangroves of the key-proper. You will note the siltation problem surrounding the mangrove areas. The deep water areas indicated in black were dredged to provide a "slide-back" for the dredge-caused silt. This technique has not been very successful. The Audubon Society has been "guaranteed" by the Trustees of the Internal Revenue Fund that the sanctuary would be protected from siltation. As you can see, siltation did occur.

This is a glaring example of the siltation of Florida's bays caused by extensive dredging.

Also attached is another infra-red photo of upper Tampa Bay. This photograph glaringly reveals the extensive dredging of Tampa Bay and the loss of marine-life breeding grounds as a result.

As an enclosure attached to page No. 4 of this statement, I have included an article printed in the March 11, 1968 edition of the Tampa Tribune. This article, based on the work of the Federal Water Pollution Control Agency, indicates the tremendous problem caused by dredged-up spoil banks in Tampa Bay. The stench resulting from stagnation and pollution in Tampa Bay is extremely irritating.

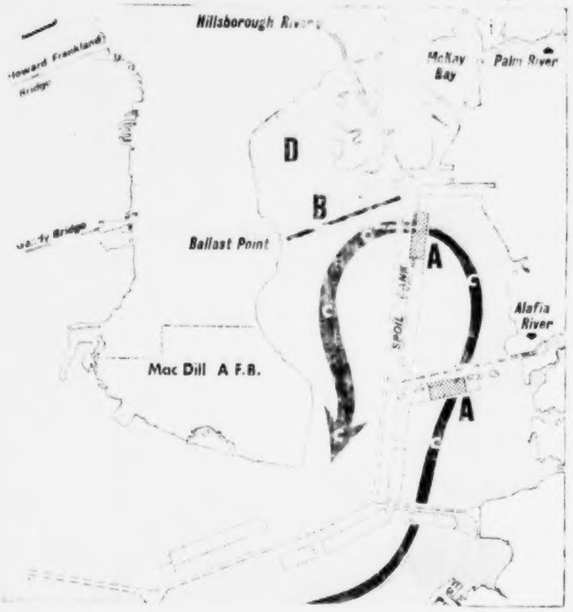


Area of upper Tampa Bay known as Hillsborough Bay.

"infra-red" photograph

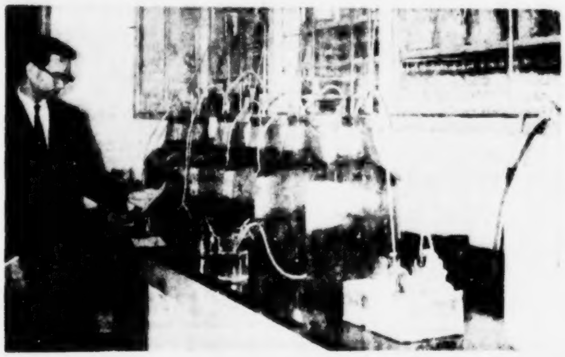
Statement of [illegible], continued.

Article [illegible] Tampa [illegible].



End to Bayshore Boulevard Stench?

John E. Hagan III, sanitary engineer in charge of a crew of 11 studying the cause of the foul stench from Tampa Bay along Bayshore Boulevard, uses a chart similar to that above to illustrate his work and his idea of a way the stench might be ended. He would cut through two spoil banks (A) to permit water to circle freely in the bay as the tide flows and ebbs (C); new spoil might conceivably be used to build a new island in the bay (D); currently the tide flows slowly all the way to McKay Bay and then forced through a narrow cut, jets back (B) straight toward Ballast Point carrying heavy deposits of phosphate and other pollutants.



Crew Chief Checks Work of Chemists

. . . John Hagan III reads water report

Bayshore Stench Won't Give Up In Easy Manner

By CLYDE SHAFFER
Tribune Staff Writer

It took a great many years for that stench to build up in the bay along Bayshore Boulevard. And it's going to take more years and some rather drastic measures to solve the problem.

This comes from John E. Hagen III, head of an 11-man crew from the Federal Water Pollution Control Agency of the Department of the Interior which has been studying the bay for eight months now and expects to spend another six on the task.

Working from laboratories on an old Army barge anchored at Hookers Point, Hagan and his crew have been taking samples of water from the bay at all hours of the days and nights—and in all kinds of weather—for study and analysis.

They probably know more about the water in the bay than anyone has ever known.

And they are already convinced that the stench will remain until the drastic measures are taken.

Hagan sees these measures as cutting passes through two spoil banks in the bay to give the water a chance to circle in and out of the bay with the tides; an end to the dumping of more spoil into the bay from future dredging, and the dredging from the bay of the many years of deposits on the bay bottom.

He has already figured out where the passes should be dredged in the present soil banks to give the circulation now prevented by the fact that spoil from the present main ship channel was piled along the east side of the cut, virtually making a dam.

And he has an idea that spoil from future dredging, including what he advocates, might even be used to build another island in the bay near Bayshore Boulevard in the manner of Davis Islands.

Hagan, a native of Punta Gorda and a graduate of the University of Florida as a sanitary engineer, says that if the Port of Tampa succeeds in getting the port's channels deepend to 40 feet and widened as the Port Authority seeks, the dredging will produce more spoil than all the previous port channel projects combined.

This is the spoil which could well be used to build up another island, mixing with it the sludge deposited along the bay bottom. The sludge is the primary cause of the Bayshore stench.

Hagan says that currently, as the tide flows, it goes up the bay, and through the narrow cut between Hooker's Point and Port Sutton into McKay Bay as well as the other sections of the estuary.

While the tide flows slowly, when it ebbs the narrow cut builds it into something of a jet stream which Hagan says goes pretty much straight across the bay toward Ballast Point, carrying with it heavy phosphate deposits from the Alafia River, presumably put in there by phosphate plants upstream.

From the Ballast Point area, the tide might circle—or at least a part of it—back up the bay along Bayshore Boulevard and contribute more to the stench by increasing deposits on the bay bottom.

Just exactly how it flows on the ebb is a part of the project Hagan heads and he expects to be making dye tests over the next three months to make an exact determination.

For this part of the project hundreds of gallons of bright red dye will be dumped into the bay for four or five tidal cycles which probably will take two to two and a half days. The flow of the dye will be studied carefully and charted by the crew.

But even if the two spoil bank cuts were made and the tide began a circling motion in the bay, flowing freely in and out, the problem would not be solved. According to Hagan, this would merely let the bay "hold its own."

It would still take the removal of the sludge piled on the bay bottom to get at the basic trouble.

The processes which caused the condition is a natural one which Hagan calls "eutrophication" or aging of a body of water. Even fresh water lakes suffer it. They silt up and vegetation and algea begin growing. This, of course, takes a long time.

But man accelerates the procedure by his activities and his dumping of all sorts of things in the water. Along Bayshore Boulevard this dumping was mainly water from storm sewers and sewage from sanitary sewers.

Hagan's crew — two engineers, three chemists, one biologist, two laboratory aides, a marine mechanic, a sample collector and a secretary — has been taking samples from the bay at 26 different stations and from 16 other stations located on the tributary streams, the Hillsborough, Palm and Alafia rivers and Six Mile Creek.

When the studies are completed in August, it will take another six or eight months to prepare a final report which is due in July, 1969. This report will go to the Florida Air and Water Pollution Commission which has replaced the State Board of Health in the field.

The next move will be up to the state and to city and county officials.

Then the stench may end.

Statement of Martin R. Northrup, continued

Most dredge and fill development has been done, and is desired by developers, for the economic reason that it was the cheapest way to acquire land. Submerged lands even recently have been sold for as little as $200-$400 per acre. Some recent sales of main traffic arteries have gone for $1500 to $1700 per acre. Dredge rights for surrounding acres then are sold - and despoiled - for as little as 3¢-5¢ per cubic yard of fill. Operations and bulkheading are done for $2000 per finished acre. Roads, curbs and drainage don't enter the cost because they would have to be performed on any land. The result is that for $2500 and up per acre choice waterfront locations have been acquired.

Where such submerged lands - in minimum amounts - should be included in a sound development plan, they should be priced at amounts that adequately repay the public who owns them for their loss.

What is their worth?

Florida has not made - but should - economic studies of the value of its productive bottomlands. Other states have, including California, Texas, Alabama, Virginia, North Carolina and other. The annual production value of these lands has been stated by scientific appraisal at from $200-$356 per year in Alabama. $380 in Texas. Oyster bottoms in the Chesapeake at from $1000 to $2500 per year. This is annual value, and should be capitalized.

The Laguna Madre behind Padre Island in the Texas Gulf is very similar to the Florida Indian River estuary. The University of Texas established its annual production value to the state at $370.18 per acre. Capitalizing this at 5% or 20 times - gives a shocking view of the true value: $7403.60 per acre. Then add the value of the 2 acres that are despoiled for every acre filled and you get $22,210.80 per acre that the land is worth based on its production value. This is not a bubble-headed figure, but a sound capitalization of annual production that is followed in the stock market, in the sale of farm land or apartments, or in any other income-producer. This is the economic value - to Florida - of our vital spawning areas and nurseries.

Obviously there occasionally are situations and areas where sales of bottomlands should be made. But an appreciation of their long-term value enables us to start from an understanding of their true worth, and will make us go slowly, will make us be sure the plan is right and in the public interest, will keep unwise sales to a bare minimum.

What is their worth?

Some of the values I'll use are completely accurate, actual recorded facts. Others are based on excellent research that is accepted by private industry and by state and federal governments alike. Others are conservative educated guesses. All of the following was researched by biologist, John L. McQuigg for the Bulkhead Seminar, Stuart, Florida, May 21, 1965. Bear in mind that the following are annual figures.

Commercial Fishing

The value of Florida's commercial fishing is a matter of record. However, the state statistics represent only the actual commercial landings, and the salt water conservation board estimates that they could at least be doubled to account also for the sales of private fishermen. I have not done that, which makes this figure extremely conservative. Florida's commercial fin-fish production was worth:

$30,790,109.00

shellfish.........$21,331,218.00

Bait Fish

Records kept only on shrimp which is less than 1/4 of the bait business according to some bait dealers.......$5,529,448.00

Statement of Martin R. Northrup, continued

Boat Sales

Florida has 3% of the U.S. population but 4.8% of the nation's recreational boats.

4.8% of the engine and boat manufacture assn.'s annual figure for national sales is a conservative.......$125,040,000.00

Boat Fuel and Upkeep

"Educated Guess" at $200 per boat annually.............$77,000,000.00
(based on Florida's 1963 boat census of 385,000 craft)

Tourism

"Educated Guess" that Florida's fishing fame brings in 31% of the tourists...........$775,000,000.00

(Based on 31% of 1963's $2.5 billion dollar tourism industry.)

Marina expenditures by visitors who come by boat.

(Small waterway marinas)
based on figure of 110,000 people who visit Florida by boat....
average expenditure of $244.35........
$26,878,500.00

Fishing tackle sales

Based on the projected income from 5% special tax....$40,000,000.00

Charter Boats

Educated guess.........$23,250,000.00
This is 3100 boats, multiplied by one-third of the year or 125 days, multiplied by an average day's fee of $50. (Now $60. in 1968.)

Large Marinas, permanent dockage

based on $5 per day dockage fee times a 13.5 day stay...$1,856,250.00
this is a very conservative figure when considering large fees paid by large yachts.

The total of all these annual figures is $1,126,975,525.

1-1/4 billions a year is a conservative estimate of the economic value of our estuarine system.

You can argue the accuracy of these figures, but you can't argue the fact that fishing is an enormously important economic asset for Florida.

Statement of Martin R. Northrup, continued

These bottomlands have great value to the Florida tax-paying public who own them. Legally, as I understand the plainly written words of the law, title to all submerged lands, bay bottom and estuarine lands seaward of the line of mean low tide are vested in the "inalienable ownership of the general public, to be guarded for the public good by the state."

And does this public use and benefit from these lands? They certainly do. The recreation commission has figures showing that 42.5% of our citizens are regular salt water fishermen - 31.3% regular salt water boatmen. They spend 59,800,000 man days on the water - which is an average of at least 14 days a year for every soul in Florida. That's heavy usage, and of great value to every resident.

Some ideas on a solution to the estuarine problem:

1. Since the bottomlands are owned "inalienabley" by the people, their rights and interests should take precedence over the rights to private profit at public expense. This is not to say that some lands shouldn't be filled. It is to say that such projects should be carefully considered, should be held to a bare minimum, should be strictly controlled, and should be approved only after a clear cut demonstration that they will advance the public good. Also, this is not to say that riparian rights are not real. They are, but basically they are limited to right of access, use, protection and view - not to a private right to profit by destruction of valuable public property. There's been too much of that in Florida. If this proposed policy were followed, development could be made reasonably non-destructive and could be limited to only wise and satisfactory plans. The recently enacted "Randall" act which requires a biological survey of submerged lands is not enough. The far reaching effects of siltation caused by dredging is difficult to gauge.

Statement of Martin R. Northrup, continued

2. We should educate constantly that bottomlands are valuable, and when necessary should be sold only at a price that represents their true value to the public, not the estimated value of the completed land, and should be sold only in absolute minimum quantities.
3. There should be the requirement for an ecological survey ~~and~~ as stipulated in the "Randall" act, prior to any sale. Rarely, some bottomlands are sterile or of minimum value. This type of survey should be required as a separate study from Army Corps of Engineer "feasibility" studies. The U.S. Fish and Wilflife Service should have funds available to match state funds for such surveys. This department should provide teams for state goverments in order that proper studies may be made. State "conservation boards" are often politically controlled and are sometimes motivated by politics in their considerations of sales of public lands.
4. Severe engineering restrictions should be placed on the operation. Dredging is even more destructive than fill and should be discouraged. Access channels should be drag-lined rather than sucked up, destroying countless additional acres. Any dredging approved should be from beyond the euphoric line, generally recognized as six-foot depths or greater. Fill from the outside should be encouraged in place of dredging. Tidal flats, mangrove growth, islands and pristine areas should be set aside for preservation. Imaginatively done they can add to the final value.
5. Bulkhead lines should be minimum, should be area-wide and should follow natural shorelines. Both Florida and U.S. Conservation authorities recommend one foot below mean low water as the bulkhead line. This recognizes that dredge-and-fill is a visious circle

Statement of Martin R. Northrup, continued

one project begets another until total destruction sets in. The loss thus is progressive - less bottom, less food, less life-subsistence, less fish and crustaceans - ultimately leading to sterility.

6. To prevent thermal pollution, before authorization of nuclear power plants, guarantees to the public should be made so that:
   a. Water released should be the same temperature as that occurring at the same depth and not the same as, say, on-shore water temperature where a shallow sheet of water could be much warmer.
   b. Levels of radio-active concentration to be tolerated should be lower than what is normally considered safe for humans.
   c. Oxygen content of atomic waste water will be predictably very low and will affect marine-life in shallow waters.

Water discharge should be located in deep oceanic waters if possible.

7. General water quality will be guarded or improved by insisting on treatment of waste waters to a degree of 90% or better efficiency of waste removal, which regulation might require tertiary treatment.
8. Waste waters leading to the ocean shall be controlled as to sewage treatment. An intensified Federal program for assisting local governments to establish treatment plants should be initiated.
9. Class 5 streams should carry dissolved oxygen of at least one part per million with an average of at least 2 p.p.m. which would support organisms helping to break down the wastes, thus upgrading the waters.
10. A national system of Federally controlled estuarine lands should be established.
11. A biological survey of the proposed waterway in Florida known as the "Missing Link" should be made before dredging authorization is made.

....Thank you for the opportunity to submit this statement.

Martin Northrup

Martin R. Northrup
2316 S. Hubert Ave.
Tampa, Florida 33609

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STATEMENT BY THE FLORIDA FEDERATION OF GARDEN CLUBS, INC., TO THE NATIONAL ESTUARINE POLLUTION STUDY, PUBLIC MEETING, MARCH 12-13, 1968, ORLANDO, FLORIDA

In the NATIONAL ESTUARINE POLLUTION STUDY brochure on page 5 under Frame of Reference, six assumptions used in the conduct of this study are listed with which we agree:

1. Estuaries have high economic and social values.
2. Attainment of maximum public return from estuarine system depends on:
    a. Protection of water quality and
    b. Land use "restriction"
3. There will be increasing pressure for multiple use of the estuarine system.
4. There is a need for a continuing, articulated research program with broad geographic scope.
5. Attainment of maximum public returns calls for a management partnership among State, Federal, and local agencies.
6. Estuaries cannot be considered independently of their watersheds or the Continental Shelf.

We would have liked to see another assumption--that there is need for a continuing and meaningful education program on the estuarine system for school children and for the public.

Conservation education in Florida's schools leaves much to be desired but is very weak in estuaries and wetlands generally. This may be true throughout the nation.

We do have a bright spot in the Marine Science Station at Crystal River, Florida. This regional center was established under Title III of the Elementary and Secondary Education Act of 1965. The facility, located on an island in an estuary, is staffed by four teachers. School classes with teachers visit the Marine Science Station for instruction.

We recommend that centers, such as the Marine Science Center at Crystal River, be established at other estuaries in Florida, and in the other coastal states, for the education of school children and the public on the estuarine system.

There seems to be a buildup in education in colleges and universities in Florida. This is good for we need research and scientists. But scientists and experts tend to talk to each other and do not communicate well with the public.

Our concern is for better communication with and education for our citizens. A government "of the people, by the people, for the people" does not operate successfully unless citizens are well informed.

Compulsory education was established as a governmental operation to assure our having an informed citizenry. We defeat the purpose of education and good government by neglecting conservation education, or great areas of the natural environment, such as the estuarine system, at great risk to all of us.

While the need for public education was not among the assumptions in the frame of reference, it is hoped this will be included in the report of this study.

Statement by: Evelyn Waybright
Mrs. Roger J. Waybright
Conservation Education Chairman
Florida Federation of Garden Clubs, Inc.
806 South Shores Road
Jacksonville, Florida 32207

THE GARDEN CLUB OF AMERICA
598 MADISON AVENUE, NEW YORK, N. Y. 10022
TELEPHONE PLAZA 3-8287

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March 20, 1968

Mr. John R. Thoman
Regional Director
U.S. Department of the Interior
Federal Water Pollution Control Administration
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Thank you for your letter of February 19th asking that our organization be represented at the Public Meeting of March 12 and 13. Since I could not be present or delegate some one from our organization to be there, I am sending a statement to be made a part of the record. The Conservation Committee of the Garden Club of America is most concerned with preservation and wise use of all our natural resources.

The Conservation Committee of the Garden Club of America agrees with the intent of the Clean Water Restoration Act of 1966 and urges its implementation.

We recommend that a thorough survey be made to determine the areas of highest importance of marine resource value. These areas should then be preserved by the State of Florida.

Estero Bay on the West Coast should be preserved - the shell beds and fishing in this area are of great value.

We hope that the following areas will be given a high priority of preservation for their marine resource value.

1. Apalachicola River and Marshes Bay
2. The Marshes and Estuarine area around Homasassa Bay
3. Cape Romano and the 10,000 island area - North of Everglades Park

4. The Tomolka River Marshes on the East Coast
5. The estuarine area in Indian River Lagoon
6. The Estuarine in St. Lucy River area

Undoubtedly there are other areas of the same caliber, however, we feel these to be of the highest value.

The Conservation Committee of the Garden Club of America recommends that a thorough study be made of the Suwanee River to determine if it should be kept as a wild River. We deplore the fact that Nassau and Duval Counties have zoned their estuarine areas for industry in three Rivers, namely, St. May, St. John and Nassau and question the wisdom of such action.

We trust that a cooperative effort will be made at the National, State and local level to make individual communities aware of the imperative need for preservation of their estuaries and marine resources therein.

Dr. Clarence Cottam, an advisor to the Conservation Committee of the Garden Club of America and past Chief of Wildlife Research and Assistant Director of the U.S. Fish and Wildlife Service said in a speech before our annual meeting in Dallas last March, "Public action is sorely needed to appropriately develop, effectively manage and wisely use and protect important coastal water and marsh resources in the brackish zone between sea and fresh water. These coastal estuaries, now endangered by pollution and by dredging and filling for real estate development, are the breeding ground and home of fish, shrimp, crabs and shellfish. In San Francisco Bay, where detailed competent studies were made and losses documented, 83 percent of the original key habitat was eliminated. Here, where ten to 15 million pounds of oysters were harvested prior to 1900, they are now almost completely eliminated. In 1965 only 10,000 pounds of Bay shrimp were harvested - before 1936 there was an annual harvest of some 6½ million pounds!"

The Marine and Bird life provide Florida with outstanding recreational facilities that are appreciated by all Americans, and must be nurtured. We trust that the current study of pollution problems in Florida's estuaries, under Governor Kirk and Mr. Nathaniel Reed's direction will show the need for their preservation for future generations.

Most sincerely,

Louise H. McKeon

Mrs. Daniel M. McKeon
Chairman
Conservation Committee

MEMBER
PANAMA CITY
BAY COUNTY
FLORIDA
Chamber of Commerce
INDUSTRY'S PLACE IN THE SUN

COMMITTEE OF 100

March 13, 1968.

Director,
Technical Programs,
Southeast Water Laboratory,
Federal Water Pollution Control Administration,
Athens, Georgia. 30601.

Dear Sir:

Mr. John R. Thoman, Regional Director of the Federal Water Pollution Control Administration invited us to present a statement at a meeting in Orlando on March 12th and 13th concerning the use and development of estaurine resources.

Unfortunately, I was not able to be present or to submit my statement in time for the meeting; however, I am furnishing this material for inclusion with the record of the meeting as appropriate.

The attached discussion of the problem on estaurine pollution and two publications attached thereto present~~s~~ background material and information relative to the problem. It also stresses the importance of finding a solution to the problem and, hopefully, indicates the direction in which we feel some of the answers may lie. I am sure you realize that in the short time available to us we could not deal with the problems and solutions in the manner which they deserve.

As to the governmental and administrative organization which must deal with these problems it is our feeling that the Federal government must take the lead in defining the problems and assembling the information available from the various research organizations, both private and public. The various States should then be in a position to take actions necessary to preserve and develop the estaurine resources.

PUT YOUR SMALL PLANT
IN PANAMA CITY, FLORIDA
PLENTY OF GROWING ROOM!

WORKING TO DEVELOP PANAMA CITY AND BAY COUNTY INDUSTRIALLY

Also, whereas it is probably governmental responsibility to preserve resources where necessary we must not forget that the development of these resources may, in many cases, best be done by private industry. Further, although it is desirable to have a firm and long range plan for the program, such a plan usually does not remain current for very long as new information and events will probably require modification. Accordingly, it is our feeling that we should begin a program of conservation and development as soon as possible and then modify it as necessary from year to year.

I hope the above will be helpful to you.

Yours very truly,

Warfield C. Bennett

Warfield C. Bennett,
Executive Director.

WCB:ld

cc: Mr. Nathaniel Reed,
Governor's Staff,
State of Florida,
Tallahassee, Florida.

Estuarine Pollution

Just what is an "estuary" and why, only very recently, has so much attention become focused on the subject of estuary systems and problems related thereto? Estuarines are generally defined as coastal zones of interplay where there is a mixing of fresh water coming from land and salt water coming from the sea, and the word "estuary" provides us with what amounts to a generic term that includes such other shoreline names as bays, lagoons, salt water or tidal marshes, grass flats, brackish swamps, mud flats, tidelands, and others.

Only lately has there evolved a full realization of the degree to which estuary systems vitally contribute to our American way of life. It would be presumptious to attempt improving upon words used by Assistant Secretary of the Interior for Fish and Wildlife, Dr. Stanley A Cain, as he described the importance of estuaries:

> The estuarine complex is generally very fertile and productive of plant and animal life-more productive, in general, than either land or sea. This is due in large measure to the dynamics of the tidal cycles, which mixes fresh water with its burden from the land-all too often humus and the best top soil-with the mineral-rich sea water and the organic products of underwater decay that are not allowed to stay settled on the bottom.
>
> Thus, a sort of constantly stirred rich broth is provided in a sheltered environment for small and microscopic plant and animal plankton to form the abundant food for successively higher links in the food chains that make up a web of life. The result is phenomenal. Perhaps two-thirds of all coastal sport fish are estuary-dependent during part of their lives.
>
> Some single estuaries are the spawning grounds, nurseries, or growing-up places for two dozen or more

species of commercially important shellfish, crustacea, and finfishes. Anadromous fish pass through the estuaries on their way from the sea to fresh-water streams to spawn, and the young return again to the sea to grow up - salmon, shad, striped bass, alewife, some trouts - sometimes pausing in the estuaries for a portion of their juvenile lives. A few species reverse such migrations, and some of course spend their entire lives in estuaries.

We estimate that about 90 percent of the total harvest of seafood taken by American fishermen comes from the Continental Shelf and about two-thirds of the species involved depend in one way or another on estuaries. Many estuaries produce more harvestable human food per acre than the best Midwestern farmland. Perhaps 8 million sport fishermen enjoy estuarine and coastal fishing and open-ocean fishing for estuary-related species. The value of commercial species supports multimillion-dollar fisheries.

I do not wish to oversell the value of estuaries, but they provide very important nesting and wintering habitat for migratory waterfowl as well as resting and feeding places during migration. In addition to the recreation provided by migratory game birds, one must add the many kinds of resident animals, some of which are fur bearing.

Estuaries also provide recreation to those who boat, hike, camp, picnic, bird watch, stroll the shores, climb the dunes and wade in the marshes. Nowhere else does wild nature and urban conglomeration occur in such close juxtaposition as it does in the case of our Nation's estuaries.

One of the paramount reasons causing sudden and great concern over estuaries is the alarming rate at which they are being literally obliterated from shoreline areas all over the United States through the process of dredging and filling. This method is employed for navigational purposes, housing and commercial developments, bridge and highway construction, mining, building marinas, garbage dumps, airstrips, military installations, etc. States receiving the greatest estuarine habitat losses through dredging and filling include California, those comprising the Northeast seaboard, and, most unfortunate from our standpoint, Florida which has lost 7-1/2 percent of its total.

This fact should be doubly disturbing to Floridians inasmuch as we rely significantly upon revenues derived from our fishery resources. It is estimated that approximately 31 percent of the tourists coming to Florida are lured here for fishing. Further, it has been estimated that the annual value of fishing to Florida exceeds one billion dollars. Recalling Secretary Cain's description of how much fish life is dependent upon estuarine habitat should make the news of our 7-1/2% loss all the more painful. It is ironic that estuarine dredging and filling was first introduced to this country by Florida for community-development purposes. Talk about biting the hand that feeds us.....

Fortunately, Florida has recognized the gravity of the situation and a state permit is now required before dredging and filling operations can commence. Excluding a few tidal area land grants to private individuals by the King of Spain during the early nineteenth century, "all lands underlying tidal and other navigable waters in Florida are property of the state. The title to and responsibility for these tidal lands is held by the State Trustees of the Internal Improvement Fund (TIIF) for disposition as they see fit. The Bulkhead Act transfers to the local levels of governments the responsibility for determining and imposing control for dredging and filling best suited to the locality, with final decision by the State."

So-we at least have a "foot-in-the-door" and the necessary reins with which to check further rampant and needless depletion of our remaining estuarine acreages. This is extremely important - we couldn't very logically concern ourselves over abating and/or preventing pollution in estuaries no longer existent. That a significant percentage of our nurturing grounds has disappeared makes those estuaries that have been spared of even greater value - it is absolutely imperative that future conservation efforts be stepped up and meet with only the utmost of success.

This will be no easy task - we're faced with an intricate problem understood in depth only by scientists and conservationists. Where do we go from here? How can we come up with a rational plan of attack?

Open meetings such as this session should be numerous and enthusiastically attended - they are requisite to the effective interchange of ideas that will steer us onto proper remedial and preventative measures needed for combating pollution.

Coming up with means to better educate the public should be placed high on the agenda. John Gottschalk, the Interior Department's Director of the Bureau of Sport Fisheries and Wildlife, has aptly stated that "the needs for public conservation education are tremendous, while the fulfillment of these needs still is sadly lacking. Many conservation organizations must place emphasis - now - on the values of coastal wetlands and estuaries. An informed public is absolutely essential to the solution of this problem."

That the public be familiarized and roused from apathy seems only fitting - after all, it's their problem! John Q. Public and his progeny are the prime beneficiaries of all natural resource conservation efforts.

How can we get our message across to the citizenry? "Clean Water" TV and radio spot announcements are good, but they should be increased in number to replace commercials especially during prime viewing and/or listening time. Moreover, situation urgency would seem to justify our employing a more poignant approach than the "America Beautification" spot followed by an appeal to "Write Clean Water, Washington, D.C." Let's show fishermen and hunters fish-kills and ducks dying from oil slicks! Such films may fall short of social good taste, but 10 to 1 public response would skyrocket. Half-hour specials on pollution could prove invaluable. Buying-time would be expensive, but increased allocations will be prerequisite to all channels of endeavor.

Pertinent literature in the forms of pamphlets, circulars, magazine articles, and books should receive wider circulation. Pesticidal pollution is treated in Rachel Carson's Silent Spring with vernacular geared to the layman's comprehension. A stimulating look at our present-day estuarine crisis is availed in a recent and timely publication, Fish and

Man - Conflict in the Atlantic Estuaries, by John Clark of the Sandy Hook Marine Laboratory of the Bureau of Sport Fisheries & Wildlife in Highlands, New Jersey. This publication is available to the public at $1.00 a copy, and orders, accompanied by remittance payable to the American Littoral Society, may be placed by writing to:

Executive Secretary
American Littoral Society
Sandy Hook
Highlands, N.J. 07732

It is crucial that publications such as the aforementioned find their way into highschool and college classrooms for required reading. I would venture that too many students at either level have never even heard the word "estuary" and much less would be able to define it.

Ideally, the present estuarine dilemna would be cleared up before another graduating class crosses the stage for diplomas, but a realistic appraisal of the situation would indicate that we are faced with the proverbial long-drawn-out affair during which many snags will be encountered.

Big industry by its very nature will pose one of the major hurdles - many of these were well established long before concern over estuarine pollution came to the fore. Here, delay in clean-up will be attributable to various factors, a few of which are:

-lack of finances for extensive and costly modifications to industrial waste discharge systems.

-selfish motivations.

-oftimes, industries are the mainstays of local economies and enjoy virtual immunity to criticism.

Toxic wastes, "blooms" from over-fertilization, siltation, pesticides - whatever causes pollution of our estuaries must be dealt with and resolved in such a manner as will best serve the nation both now and in the future. Industrial progress need not be impeded in the process, but alternative solutions will have to be considered very carefully and the best means to the ends selected through intensely coordinated planning.

It will take much money. . . . .

STATEMENT ON BEHALF OF
TOWN OF OCEAN RIDGE WITH
RESPECT TO ESTUARINE POLLUTION

DESCRIPTION = Ocean Ridge is an incorporated Town in Palm Beach County Florida extending approximately 3 miles in a Southerly direction from the South Lake Worth Inlet. It is bounded on the East by the Atlantic Ocean and on the West by Lake Worth and the Intracoastal Waterway. Its maximum width from Ocean to Waterway is approximately a quarter of a mile. Ocean Ridge is almost completely a residential community, the only commercial activity being at the "Boynton Inlet" Docks where there is a restaurant, a fleet of charter fishing boats and two party fishing boats. There is a moderate amount of tourist activity in the form of motels, seasonal home rentals, etc. What development that has taken place along the shores of Lake Worth and the Waterway, with the exception of the fishing center above noted, is 95% private residential with many fine and well maintained homes along the shores of the lake and Waterway and the adjacent canals.

USE - The present use of the lake and Waterway by the residents of Ocean Ridge is for boating and fishing. The Town of Ocean Ridge has no system of sanitary sewers, discharges no sewage directly into the estuary. All domestic sewage is handled by septic tanks under the purview of the Palm Beach County Health Department. Other uses of the estuary in the vicinity of Ocean Ridge are as follows: A small amount of commercial traffic, a considerable use, particually during the tourist season, as a highway for yachts traveling between Northern points and such Gold Coast cities as Ft. Lauderdale, Miami, the Keys, etc., a reservoir for the discharge of sewage by the mainland municipalities to the West.

PRESENT CONDITION - It is apparent to anyone making the most casual inspection, that the waters of Lake Worth and the Waterway bordering on Ocean Ridge are polluted. The water is turgid of a brownish color and at times has a distinctive and unpleasant odor. Often when there is a Westerly or North Westerly wind large quantities of dirty and sometimes disgusting debris collect in the finger canals. This commentator can offer no opinion upon the degree of pollution since no physicial or biological studies or measurements have been made. However by common agreement, if indeed not by Health Department advice, the waters are considered unsafe for swimming, and the shellfish along the shores are too contaminated to be of value as food. It is also said that fishing the South end of Lake Worth has suffered by reason of the polluted waters.

GENERAL OBSERVATION - There is deep concern shared by a large majority of the residences of Ocean Ridge that unless prompt steps are taken to remedy these conditions, which in the opinion of many have already passed the point of tolerance, then these waters will soon be of value only for commercial purposes and as a depository for untreated or partially treated sewage; that they will be turned into "dead" estuaries, unsuited for recreation and by reason of the ever increasing wastes to constitute a threat to the ecology of the Offshore waters of the Atlantic Ocean.

CONCLUSION - We hope that prompt action may be had to implement corrective measures. From the point of view of the community at the moment, the matter needing first attention is the elimination of the discharge of sewage into the water of the lake. We are aware that this problem is beyond the means of the great majority of the small communities to solve. It requires the imposition maintenance of strict standards of compliance and as well some financial assistance by State or Federal Agencies on large scale over all patterns. We hope that these may be achieved in the not too distant future.

Respectfully submitted,

Edward H. Innet

Edward H. Innet, Mayor
TOWN OF OCEAN RIDGE

PHONE 734-3000

BARRY CRIM
Management Consultant
434 N. COLORADO AVE.
DeLAND, FLORIDA 32720

February 5, 1968

Mr. John R. Thoman
U. S. Dept. Of The Interior
Federal Water Pollution Control Admn,
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Attached is a short "overview" of some conditions arising in our country because of Water Pollution. Also included are one or two generalized solutions of this problem, offered by some of our nation's experts. This overview was prepared for our DeLand Chamber of Commerce, and we hope it may be of some use to your Department in abating this problem.

To the writer, it seems apparent that since water pollution in one state often contaminates water flowing into other states, one basic solution of this problem would lie in strictly enforced federal laws relating to this subject. Otherwise, special interests at the state and community level could promote legislation that would increase the damage caused by water pollution, rather than decreasing it.

However, in order to show good faith in our present laws relating to the abatement of Water Pollution, the Federal Government needs to exercise tighter controls over the pollution now arising from military and naval installations, ships that are docked at ports, etc. One example of this lack of federal control recently publicized was at Groton, Connecticut; our country's largest submarine base. The citizens there were highly aroused because of the many tons of raw sewage being dumped each day by the Navy into waters surrounding this area.

With proper research and the strict enforcement of federal laws relating to Water Pollution, this problem now causing many hazards to our health and economic progress, can be eliminated or abated.

Cordially,
Barry Crim
Barry Crim.

BC: mg

REPORT

WATER POLLUTION

OF THIS NATION

COMPILED BY E. B. CRIM, L. L. B.,
CHAIRMAN OF AIR AND WATER SUB-COMMITTEE
DELAND CHAMBER OF COMMERCE
NATIONAL AFFAIRS AND LEGISLATIVE COMMITTEE
DELAND, FLORIDA
1965

137

WATER POLLUTION

An overview of this problem in the United States

HOW SAFE IS YOUR DRINKING WATER?

U. S. News and World Report - July 15, 1963

1. 40% of the U. S. population is drinking and using water that has been used in other homes, or by industry, and later discharged as sewage, as much as five times.

2. Water pollution by modern detergents - which are supposed to decontaminate water - is the most common cause of public complaint. Here, the detergents become almost as obnoxious as the sewage itself.

3. In areas where homes discharge sewage into septic tanks, the detergents often seep down into underground water and later is pumped into wells for human consumption.

   In Wisconsin, as an example, tests showed that some of its underground water in 64 of its 71 counties was polluted.

POLLUTION OF U. S. WATER - HOW SERIOUS?

U. S. News and World Report - September 16, 1963

In an interview with Dr. Luther L. Terry, Head of the U. S. Public Health Service, the following facts were disclosed:

1. The problem of reusing water from lakes is more serious than reusing river water. Rivers finally discharge their pollutions into the ocean. Whereas, lake water remains in a lake, and constant pollution completely changes the character of the water. Lake Erie has been changed into a stinking pot of filth, compared with its beauty and recreational uses of a few years ago.

2. In 1963, more than 1,500 communities composed of 13 millions of people were dumping untreated sewage into their streams. Another 1,500 were discharging inadequately treated sewage of 17 millions of people into their streams.

   More than 2,700 small towns in the U. S. composed of population areas of 6 millions of people did not, in 1963, even have sewer or treatment facilities.

OYSTER STEW - THE NEW REPUBLIC - JANUARY 4, 1964 ISSUE

The New Hampshire Fish and Game Department reported, in October, that six people had come down with dysentery from eating raw oysters taken from Great Bay in New Hampshire, whose water was polluted. Also, many cases of Hepatitis have been reported from eating shellfish in other areas.

FLORIDA TIMES UNION - JULY 6, 1965

Statements by U. S. Congressman Robert E. Jones, Alabama, Head of Federal Committee on Water Pollution.

1. Federal lethargy is one reason for the present nationwide water pollution. There is conflict of policies between the agencies, etc.

2. Congressman Jones mentioned that significant progress had been made by the Federal Government insome areas in the elimination of water pollution. But, he said, there are at present, 68 army, navy, air force, marine corps, and other federal agencies that are spewing 19 millions of gallons of sewage and 2.4 millions gallons of industrial wastes into streams every day.

SOLUTIONS OF THIS PROBLEM, AS PROPOSED

The experts in the U. S. News and World Report of July 15th, suggested that since the amount of water in the U. S. is remaining constant, while the population and industrial growth is rising rapidly, the only solution might be the de-salting of sea water for family use on a large scale.

On July 4th, 1965, Secretary of the Interior, Stewart Udall, was interviewed on the question of Water Pollution by "Meet the Press". His solution was that all commercial firms, or others, who regularly polluted streams or lakes should have a special tax levied on them that would be so high they would stop polluting the waters.

Again, may we suggest that your civic group take thoughtful and constructive ACTION to abate the problem of Air and Water Pollution.

City of Port Orange
TELEPHONE 767-1644
Port Orange, Florida

OFFICERS
MAYOR:
WILBUR C. WILLIS
VICE-MAYOR
RAYMOND E. ROSE
COUNCILMEN:
S. MILTON CARLTON
J. D. OSTEEN
GLENN A. CARDWELL
CITY CLERK:
GEORGE C. STUART
CITY ATTORNEY:
E. WILLIAM GAUTIER

OFFICE OF THE MAYOR
POST OFFICE DRAWER 5
PORT ORANGE, FLA.

February 22, 1968

Reproduced from best available copy.

Director, Technical Programs
Southeast Water Laboratory
Federal Water Pollution Administration
Athens, Georgia

Re: Pollution, Halifax River

Dear Sir:

I respectfully submit herewith my statements and recommendations as per the request of Governor Claude Kirk, in conjunction with the comprehensive pollution study as authorized by the Clean Water Restoration Act of 1966 as follows:

Location:

The Halifax River meanders northerly from Ponce Deleon Inlet and parallel to the Coastal Waters of the Atlantic Ocean, through or adjacent to the Cities of Ponce Inlet, Port Orange, Daytona Beach Shores, South Daytona, Daytona Beach, Holly Hill, Ormond Beach and a heavily populated county area north of Ormond Beach to the vicinity of Tomoka River Basin.

Assets of the Halifax River:

The Halifax River provides approximately thirty miles of scenic beauty along its course and an ideal area for our tourist and local residents to boat and fish along with water skiing and swimming, where bodily contact is approved. This River has a beautiful natural setting and along with the wonderful ocean beach constitutes one of the area's major assets, locally and tourist wise. Through its position as one of the major tourist attractions of our area it contributes heavily to the basic economy of the area, which depends greatly on tourism.

Amount of Pollution:

The Halifax River and that part ofIndian River, which meanders southerly from Ponce DeLeon Inlet through the Cities of New Smyrna Beach and Edgewater is so grossly polluted that the State Board of Health has for many years, closed all of the Halifax River and that part of Indian River as far south as the south limits of Edgewater approximately, to the taking of any shell fish of any type whatsoever and there is a very small percentage of this area that is approved, for water skiing, swimming or any other bodily contact, by the State Board of Health.

Source of Pollution:

The pollution of the Halifax River is derived from many sources. The main source is the amount of untreated sewerage from adjacent sewer plants and septic tank effluent from those areas that do not have sanitary sewer mains. There is also the raw sewerage that is dumped into the river by the yacths moored in the Municipal Yacht Basin, in the City of Daytona Beach. The Halifax Drainage Canal, which lies in the western section of the area and runs parallel to the Halifax River is also grossly polluted, as shown in the attached pollution survey conducted by the Florida State Board of Health, which was requested by the Board of County Commissioners, at the request of the City of Port Orange.

The pollution in this canal ultimately finds its way into the Halifax River via the canal opening at Eleventh Street in the City of Holly Hill and the opening into Rose Bay in the County area southeast of the City of Port Orange.

Effects of Pollution:

In past years there was operated in the City of Port Orange two oyster gathering and processing firms, The Seminole Oyster Farms, and Sands Oyster Company. Both of these firms grew their own oysters on their leases in the Halifax River and processed them in their plants located on the river in the City of Port Orange.

They employed many people and contributed a great deal to the economy of the area. The pollution of the river caused the closing of their leases for the taking of shellfish and consequently the closing of their plants creating a great loss of employment and income in the area. The pollution has also materially reduced the fishing potential in the area and will soon cause the complete loss of water sports in the river, thus reducing the areas effectiveness as a tourist attraction.

Summation:

Although I realize the foregoing is quite lenghty I have submitted these statements and reports in the hope that it will emphasize the dire need in our area, and I'm sure the entire United States, for a strong and well financed pollution control commission. Inasmuch as the pollution problem is of National scope I am of the opinion the Government should establish and adequately finance a U. S. Water Pollution Control Commission, with Districts of appropriate size, taking into consideration the population, number of streams, lakes etc. in which pollution might occur, and other related factors. I believe that Congress should establish this Commission as a complete and individual commission and allocate sufficient funds for this commission to operate effectively. This commission should be empowered to receive, review and make recommendations on all requests for federal grants sought for assisstance in any projects effecting pollution control. I feel that Congress should increase the amount of federal funds, made available to the States, Counties and Municipalities for pollution control projects, to the fullest amount possible. Although our U. S. Public Health Service has done a good job, it is apparent that, due to lack of adequate funding or authority, they have not been able to control the ever increasing pollution of our natural resources in the United States. This ever increasing pollution of the estuarine and Coastal Waters of the United States and particularly the State of Florida will soon cause the loss of one of our greatest natural assets. There has to be a stopping point somewhere in the pollution of our waters and the sooner Congress establishes a commission with the authority and funds to find this point and enforce it the better for all concerned. In closing I would like to say I sincerely hope, should Congress see fit to establish such a commission, they will not tie the commissions hands with lack of authority or funds, thereby prohibiting the commission from doing a job that needs doing so badly.

Respectfully yours,

Wilbur C. Willis
Wilbur C. Willis
Mayor

WCW/sh

TOWN OF KENNETH CITY

Office Of Mayor and Council

[illegible] 58th Street North • KENNETH CITY, FLORIDA 33709 • Telephone 544-6202

1957

February 23, 1968

Mr. John R. Thoman
Regional Director
Southeast Region
Suite 300
1421 Peachtree Street N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Your letter of February 15, 1968 with Estuarine Pollution Study at hand. This action on the part of the Federal Government is in my humble opinion a must and has been long over due.

The immediate use to which all of the streams in various parts of Florida (due to flat profile) is primarily drainage. As our city is on Joes Creek drainage area, we have from actual experience knowledge as to Natures way of building up deterrents to the normal flow of surface waters where they enter into the ocean or bay and eventually back water up on the drainage areas.

Joes Creek drains west side of St. Petersburg residential area and flows through our City. Under normal rainfall no hardship is involved, but if abnormal rains the area in Kenneth City is in flood area. This is due primarily to the outlet area of Joes Creek as it empties into the Cross Bayou Canal. To our knowledge no work has been done on this area of the canal or the point where the Joes Creek enters the canal. In our opinion every effort should be made to open up both canal and the mouth of the creek. Sewage discharge as well as wastes into the creek should be on the prohibited list for the entire length of Joes Creek.

The pollution of Tampa Bay via the refuse dumped from the cleaning process of motors at International Airport should be eliminated to keep Tampa Bay clean. The City of Tampa has its own problems of sewage dumping control into the bay.

The area, which in my opinion, should be developed is Old Tampa Bay for a fresh water supply for sanitary water systems for both Tampa in Hillsborough County and all three Cities of Pinellas County.

The fresh water which is now running freely away from Tarpon Springs area could be diverted to Tampa Bay for a most useful purpose at an economical cost to our public. The solution of problems of good house keeping in sanitation often provide many answers to our many needs, when there is a fresh water need.

Fresh water demand is pushing slowly our fresh water suppl~~ies~~y. Definitly something must be done.

Thanking you for the opportunity to contribute our thinking on the problem as it affects our city, I am

Very sincerely yours

David L. Alloway - Mayor

DLA/g

CITY OF Lighthouse Point
BROWARD COUNTY, FLORIDA

OFFICE OF THE MAYOR
WHITEHALL 1-2316

2200 N. E. 38TH STREET
LIGHTHOUSE POINT, FLORIDA
33064

February 28, 1968

Mr. John R. Thoman
Regional Director, Southeast Region
Federal Water Pollution Control Administration
1421 Peachtree Street, N.E., Suite 300
Atlanta, Georgia 30309

Dear Mr. Thoman:

I received your letter of February 15th regarding the meeting to be held in Orlando March 12th to study various pollution problems. Due to other commitments, I will not be able to attend. I do, however, have a couple of thoughts I would like to pass on to you.

In the southeast coastal area of Florida, we have become highly urbanized in a short period of time. Much of this development is waterfront development whereby the natural estuarial areas have been filled in or dredged out as the case may be for the construction of expensive buildings. There is no question in my mind that this has greatly contributed to the pollution of this area with possibly the worst to come in the future. I have lived in this area for the past twelve years and am an avid fisherman. Without question, I can say that the fishing in this area has steadily declined since my arrival here. I feel certain that a good share of this decline is the result of the destruction of the natural estuaries that were once available. Another effect of this dredging and development has been the intrusion of salt water into fresh water bodies. This, of course, has a profound effect on wild life as well as the vast amounts of pure water necessary for human consumption. I feel it is imperative that what few natural estuaries are left should be preserved at all cost by either the state or federal government.

We also have a very serious problem in our area which is mounting in intensity each day. It may not be directly in line with your investigation of estuarial lands, but it certainly comes under the water pollution heading. I am speaking of the amount of sewage directly placed in tidal waters and inland waters by boats, especially those on which people live for a considerable period of time at marinas. We have in this area a great many visitors from the north who consistently use our waterways. During the winter season, the amount of boat traffic is unbelievable. Each of these boats at one time or another contributes significantly to the pollution of our area. As a result, it is of the utmost necessity that federal legislation governing the disposal of sewage from boats be considered and acted upon at once. To me as a public official in the southeast Florida area, this is the most urgent situation that faces us today.

Again, I appreciate the opportunity of mentioning these items to you. I hope they will be of some value.

Sincerely,

John H. McGinn
Mayor

JHMc:fb

UTILITIES COMMISSION
CITY OF NEW SMYRNA BEACH
POST OFFICE BOX 519
NEW SMYRNA BEACH, FLORIDA 32069

J. U. GILLESPIE
CHAIRMAN
J. CARLYLE HARVEY
VICE CHAIRMAN
JOHN C. DEAL

J. E. TUMBLIN
SECRETARY-TREASURER
W. E. SWOOPE, JR
E. WILLIAM GAUTIER
ATTORNEY

February 27, 1968

Director, Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control Administration
Athens, Georgia 30601

Dear Sir:

We received your letter of February 15, 1968, regarding Estuarine Pollution Control and associated management of same. We are honored by your interest and your invitation. I am the Director of Utilities for this City and our Mayor has asked me to answer your letter and act as our agent in this matter. I do not qualify as an expert and will refrain from making specific technical recommendations. I would offer comments in support of your activities as follows:

1: New Smyrna Beach is a coastal city in Florida. We know from experience that the condition of our inlet and the surrounding estuarine waters are vital to the economic condition of our community. We feel strongly about this matter. We support, without reservation, your endeavors to study and control the use or abuse of scud waters.

2: We have gone to considerable expense, $4,500,000, to install a sanitary sewer system to correct our own past abuse of our estuary. This is of no avail if surrounding communities do not follow suit or inland areas or industries continue to dump untreated wastes into the feeder tributaries or the ground water systems.

3: We believe that restrictive legislation and code enforcement is needed with regard to future marina construction and updating existing marinas. Legislation is also needed with regard to the construction of boats, yachts and ships. Those vessels of sufficient size to accomodate "live aboard" facilities should be required to treat waste products or to have holding tanks for discharge into municipal sanitation systems.

4: We have our own electric system and own and operate a steam electric station. Thermal pollution is of concern to us. We do not just give lip service to pollution control. We burn all gas, no oil and no dual fuel firing, at our station, with a high stack; to reduce as much as possible any air pollution.

I am, however, slightly concerned about some of the proposed temperature limitations on our cooling water discharge. The finest fishing in our community is in our discharge basin. So much so that we are considering building an outdoor recreation park on this area. It is doubtful that we could comply with proposed thermal limits (depending on the interpretation of the phrase "after reasonable mixing") and yet as stated above, the fishing is very fine in our discharge basin. There seems, therefore, to be some conflict between actual experience and expert opinion. Please review this problem area carefully. You may use our facilities for actual on site studies if you so desire.

5: Silence is golden they say, but we are pollution control minded in this community. I feel you should be aware of a source of possible pollution from electric generating plants. It is necessary to use chlorine or other chemicals in the intake structure to control the growth of shellfish in the intake lines and condenser. Care should be taken in the use of more toxic chemicals in order to avoid downstream contamination.

6: Another source of possible, but not probable, contamination is water treatment plants. We have an ion exchange water (potable) treatment plant (zeolite process). It is possible other coastal cities operate similar plants. We have a flowing brine well which we use to regenerate our zeolite softners. The waste water from this process is piped to the inland estuary. I doubt that it is a contaminant but we would be happy to have your evaluation. This and similar operations perhaps would warrant your analysis.

7: One wonders if municipal storm drainage systems, for the handling of storm waters from streets etc., which do not go through the waste treatment plant are a source of contamination from anything other than a sedimentation and color standpoint. Perhaps this would warrant further analysis.

8: A brief comment about the role of various governmental units is probably appropriate:

> I do not believe that industry, state or local government has indicated a sufficient degree of responsibility or interest in the past for the problem to remain solely in such hands. Political and financial problems are such (to be realistic and frank) that the solution would not be forthcoming. I do not believe in the Federal Government doing everything, but I do feel that vital problems which the people are unable or unwilling to tackle become legitimate areas for federal assistance and interest. It is possible

> that federal legislation with enforcement handled through a Federal-State laison type agency is a reasonable approach.

I think you can see from the context and open approach exhibited in this letter, that we are vitally interested in the general problem. Our best wishes to you in this undertaking. We offer our City, its problems and its facilities if we can be of service. These thoughts are for your information only, we will be unable to attend the meetings in Orlando.

Respectfully,

J.V. Little
Director of Utilities

CC: Mr. Nathaniel Reed

February 28, 1968

Director, Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control
Administration
Athens, Georgia 30601

Dear Sir:

Attached is a resolution by the Niceville-Valparaiso Chamber of Commerce concerning the Clean Water Restoration Act of 1966 and the study presently being made by the Department of Interior concerning this Act.

The Niceville-Valparaiso Chamber of Commerce is concerned that the problems of industry be given full and careful consideration in any recommendations made by the Department of Interior for future management of the Nation's estuaries.

It is the intent of the attached resolution to bring to you our concern for industry in the matter with the hopes that you will give your full consideration.

Yours very truly,

John A. Oerting Jr.

John A. Oerting, Jr.
Chairman, Industrial Committee

JAO/bs

Attachments

RESOLUTION

WHEREAS, The Niceville-Valparaiso Chamber of Commerce is interested in promoting the economic, social, and cultural growth of the State of Florida and Okaloosa County and, in particular, the Cities of Niceville and Valparaiso, and

WHEREAS, The Niceville-Valparaiso Chamber of Commerce realizes the necessity of a balanced economy in the accomplishment of orderly, sound growth; and knowing the equally important roles played by industry, business, and tourism (recreation) in a balanced economy does therefore seek to achieve in matters effecting industry, business, and tourism (recreation) a course of action fair and workable for all.

THEREFORE BE IT RESOLVED by the Niceville-Valparaiso Chamber of Commerce that any recommendations to be made to the United States Congress by the Department of Interior as required by the Clean Water Restoration Act of 1966 for future management programs of the Nation's estuaries give full and careful consideration to the effects of those recommendations on industry, business, and tourism (recreation) to the end that each of these vital segments of our economy may continue to grow and prosper to the benefit of all the people of our cities, counties, states, and Nation.

ADOPTED this 4th day of March, 1968.

C. W. Ruckel Jr.
C. W. Ruckel, Jr., President

John A. Oerting Jr.
John A. Oerting, Jr., Vice-President

Carlton Peters, Treasurer

BOARD MEMBERS:

J W Manning

H. L. Beckham

ATTEST: Sara Edwards
(Mrs.) Sara Edwards, Secretary

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COUNTY OF MARTIN
STATE OF FLORIDA
waterways of enchantment

Board of County Commissioners
Post Office Box Six Two Six
City of Stuart, Florida 33494

TIMER E. POWERS, Chairman; JOHN F. SAUNDERSON, Vice-Chairman
JAMES H. BRUNER, JOHN W. HUSSEY, FRANK A. WACHA

March 11, 1968

Mr. John R. Thoman, Regional Director
U.S. Department of the Interior
Federal Water Pollution Control Adm.
Suite 300
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Pursuant to your letter of February 13, 1968, please accept this as our statement for the public records of the meeting concerning the future development of estuarine resources throughout Florida:

1. Conservation of fresh water -
   Reduce siltation in St. Lucie River.
2. Municipal, Agricultural and Industrial Pollution in Estuaries -
   Research Problems for Solution.
3. Dredge and Fill in Estuary -
   Public Welfare - rather than personal gain development.
4. Recognize the value of Fisheries and of Estuaries to Martin County -
   Unique Part of Economy.
5. County - Valuable Areas -
   Very Valuable Areas - Protected by Preserves (Lee County) - Government Monies - Not Private - Areas should be Evaluated by the State and Locally.

6. Desire to have Inlet opened and maintained to Safeguard the: Beaches, Human Lives and to balance the ecology of Estuarine areas.

Thanking you for your cooperation in this matter, I am

Very truly yours,

Timer E Powers

TIMER E. POWERS, CHAIRMAN
BOARD OF COUNTY COMMISSIONERS
OF MARTIN COUNTY, FLORIDA

TEP:ph

1000 TOWN HALL AVE.
P. O. Box 1098
33458

TELEPHONE 746-7100
POLICE DEPT. 746-7400

Town of Jupiter

Jupiter, Florida

March 11, 1968

Mr. John P. Thoman, Reg. Dir.
Dept. of Int. FWPCA
1421 Peachtree St.
Atlanta, Georgia 30309

Dear Mr. Thoman:

The Town of Jupiter has established a bulkhead line which could well be emulated by other estuarine areas. This line is established near the high-water mark, for all but a small part of the area. The commissioners work with the various applicants in an endeavor to preserve the unique aspects of our area. Currently we are waiting for Palm Beach County to complete their bulkhead lines for the unincorporated areas on the Loxahatchee River. Hopefully, these will conform to the guidelines established by the Town of Jupiter.

Since we have a Class II (Shellfish Harvest) rating on the Loxahatchee, our major concern at present is to upgrade and enhance existing conditions through a central sewage system which would serve the north Palm Beach County area. This would serve to protect existing clam and oyster beds and allow their harvest.

It is also our desire to have the Jupiter Inlet opened and maintained in such a manner as to protect our valuable beaches, safeguard human life and balance our ecology in this estuary.

Thank you very much for your interest in our area. Please keep us informed of any activity from your Department concerning our area. We stand ready to help in every way possible.

Sincerely yours,

Robert F. Culpepper

Robert F. Culpepper, Mayor
Town of Jupiter

RFC:ia

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Incorporated in 1925

Jupiter - Tequesta Chamber of Commerce

JUPITER *FLORIDA*

JUPITER-TEQUESTA ON THE OCEAN FIRST IN THE FAMOUS PALM BEACHES
ON U. S. HIGHWAY NO. 1

March 11, 1968

Mr. John R.Thoman,Regional Director
Federal Water Pollution Control Administration
Dept. of the Interior,
1421 Peachtree St.
Atlanta,Georgia 30309

Dear Mr.Thoman:-

The Chamber of Commerce has asked Philip A.Lund, one of our Directors, to represent us at the coming meeting on our Estuaries.

The points of concern we are stressing are:

That dredge and fill operations be allowed only when the whole public will benefit;

That present mangrove growths be protected;

That areas of vegetated shoreline be zoned to protect existing tidal beaches for ecology;

That sewage and farm areas draining detrimental materials be kept out of the river;

That the pristine headwaters be preserved.

We are deeply interested in the work of your department and in preserving the beauty and high standing of our river.

Sincerely yours,

Anna Minear

Anna Minear,secretary

YOURS FOR FRESH AND SALT WATER FISHING — WHERE THE GULF STREAM MEETS THE LOXAHATCHEE

Jupiter - Tequesta Chamber of Commerce

JUPITER *FLORIDA*

JUPITER-TEQUESTA ON THE OCEAN FIRST IN THE FAMOUS PALM BEACHES
ON U. S. HIGHWAY NO. 1

March 11, 1968

Mr. John Thoman
Regional Director
Department of Interior - FWPCA
1421 Peachtree St.
Atlanta, Georgia.

Dear Sir:

The Committee of 100 of the Jupiter-Tequesta Chamber of Commerce works closely with and fully endorses the proposals of the Loxahatchee River Chapter of the Izaak Walton League. We recommend their suggestions receive careful consideration at your Committee hearings.

We highly commend and are completely in accord with the proposed plan of the Army Corps of Engineers for rerouting C-18 Canal to give direct access to Lake Okeechobee, and the back pumping of water from coastal canals for emergency fesh water storage. The rapid population and industrial growth of north Palm Beach County and south Martin County make this development vitally important to conserve fresh water and protect the ecology of salt water estuaries and prevent salt water intrusion.

Under present conditions vast quantities of usable water drain into the Atlantic Ocean during periods of heavy rainfall. North Palm Beach County is the only heavily populated area in southeast Florida without direct access to the Lake, south Florida's greatest reservoir, as an emergency supply of fresh water during drought periods.

The conservation and proper use of water is so important for the future development, even the very existence, of the entire United States, we urge your Committee to use every means at its disposal to rapidly further this much needed imporvement.

Thank you for permitting The Committee of 100 to express our concern at this important conference.

Very truly yours,

Alfred Weeks

ALFRED WEEKS, Chairman,
COMMITTEE OF 100

YOURS FOR FRESH AND SALT WATER FISHING — WHERE THE GULF STREAM MEETS THE LOXAHATCHEE

MANATEE COUNTY HEALTH DEPARTMENT
202 SIXTH AVENUE, EAST, BRADENTON, FLORIDA 33505-TELEPHONE 744-3531

GEORGE M. DAME, M.D., DIRECTOR

March 19, 1968

Mr. John Thoman
Technical Program Director
Southeast Water Lab
Federal Water Pollution Control Administration
Athens, Georgia 30601

Dear Mr. Thoman:

The County Commission in Manatee County received the invitation to attend the estuarine pollution hearings in Orlando, but thought that the Manatee County Health Department had received a similar invitation but didn't; therefore we were not able to make a presentation at the meeting.

We understand that additional testimony may be made in writing.

We also understand that testimony was presented in Orlando to the effect that phosphate processing plants were not a problem regarding water pollution in the estuarine areas of Florida.

Attached are a number of reports documenting a water pollution episode in Bishop's Harbor (an estuarine area) last August.

At the present time we are trying to resolve a waste water situation where pollution is seeping through the walls of the Borden Company's cooling pond and discharging into Bishop's Harbor. This waste contains 600 - 700 ppm phosphates and 40 - 50 ppm fluorides.

We believe this information will be helpful to you in pointing out that phosphate companies can be "bad actors."

If we can be of any further help, please let us know.

Very truly yours,

Frank L Cross Jr

Frank L. Cross, Jr.
Sanitary Engineer

FLC:vf

Enclosure

cc: Mr. Randolph Snell
Mr. Elwood Larsen
Mr. Nick Mastro
The Board of County Commissioners
Dr. George M. Dame

MANATEE COUNTY HEALTH DEPARTMENT
202 SIXTH AVENUE, EAST, BRADENTON, FLORIDA 33505 - TELEPHONE 746-4181
GEORGE H. DAME, M.D., DIRECTOR

December 21, 1967

The Board of County Commissioners
Manatee County Courthouse
Bradenton, Florida

Gentlemen:

In reference to what recourse the County might have in the incident of acid wastes entering Bishop's Harbor from Borden fertilizer complex, Mr. Richard A. Hampton states in his December 12 letter to you, "The only step which might be appropriate for the County to consider would be to make a full report of this situation to the State Board of Conservation and request that they make their own independent determination as to the merits of asserting a claim against Borden Chemical Company for this damage. Perhaps the first step in this regard would be for a meeting to be arranged with the Directors of the Board of Conservation and their attorney."

The Pollution Control Advisory Committee recommends that this step be taken. I respectfully suggest that you arrange such a meeting and that one of the Commissioners, Mr. Hampton, Mr. Frank L. Cross, Jr., Mr. Don Lovejoy and Mr. Ross Socolof meet with the Board of Conservation Directors.

Very truly yours,

Randolph Snell

Randolph Snell

RS/vf

MANATEE COUNTY
BOARD OF COUNTY COMMISSIONERS

Dan P. McClure, CHAIRMAN
Nathan Taylor, VICE CHAIRMAN
Richard P. Briggs
Ken D. Dierks
Robert C. Hutches

COURT HOUSE
BRADENTON, FLORIDA
33505

December 12, 1967

The Board of County Commissioners
Manatee County Court House
Bradenton, Florida

Re: Pollution of Bishops Harbor

Gentlemen:

You have requested that I advise you concerning whether or not Manatee County has a cause of action against Borden Chemical Company for damage done to the marine life in Bishops Harbor as a result of a break in one of their dikes in August of 1967. This letter will confirm my previous oral advice concerning this matter.

Written reports concerning this incident prepared by Frank L. Cross, Jr. of the Manatee County Health Department and by Mr. Ken Woodburn of the Florida State Board of Conservation indicate that there was possibily some damage to private property located in the area and that there was, without question, damage done to the marine life in Bishops Harbor. None of the reports, however, attempt to place any money value upon the damage done to the marine life in Bishops Harbor.

There is substantial conflict between the parties involved concerning what caused the dike to break. For the purposes of this opinion, it was not necessary for me to make an evaluation of these conflicting claims. For the purpose of this opinion, I have assumed that the Borden Chemical Company was 100% at fault.

Even making this assumption, it is my opinion that Manatee County has no cause of action. The reason for this is that Manatee County owns no property which received any actual damage. If private property owners received some damage then they alone can bring a suit against Bordens for the damage which resulted to their property. The submerged lands in Bishops Harbor are owned by the State of Florida not by Manatee County and therefore any cause of action which may exist for the damage done to these submerged lands lies, in my opinion, with the appropriate agency of the State of Florida. There is no specific statutory authority whereby the State has conferred upon Manatee County the authority to bring such a legal action in its behalf.

Manatee County does, in my opinion, have sufficient legal authority to require that appropriate corrective steps be taken by Borden Chemical Co. to insure that something like this does not happen in the future and it is my understanding that corrective action has been or is being taken at this time.

The only step which might be appropriate for the County to consider would be to make a full report of this situation to the State Board of Conservation and request that they make their own independent determination as to the merits of asserting a claim against Borden Chemical Company for this damage. Perhaps the first step in this regard would be for a meeting to be arranged with the Directors of the Board of Conservation and their attorney.

I will be happy to discuss this matter with the Board or with any other person whom you direct in more detail at any time.

Very truly yours,

Richard A. Hampton

RAH:ew

cc to Dr. Dame
Mr. Frank Cross, Jr.

BIO-ASSAY AND CHEMICAL ANALYSIS STUDIES RELATED TO THE VARIOUS WASTES FROM THE BORDEN CHEMICAL COMPANY PHOSPHATE COMPLEX

(Piney Point, Manatee County, Fla)

OCTOBER 1967

F. L. CROSS, DIRECTOR
ENVIRONMENTAL ENGINEERING
MANATEE COUNTY HEALTH DEPARTMENT
202 6th Avenue East
BRADENTON, FLORIDA 33505

OUTLINE

Letter of Transmittal

General Discussion

Data Summaries

Observations and Conclusions

Comments and Recommendations

Discussion of Results

Bio-Assay Curves

pH versus Concentration Curves

Bio-Assay record sheets

Bibliography

1.....Report from Jim Taylor on Barnacle Buckets
2.... Letter from Ken Woodburn, Florida Department of Conservation, concerning conditions in Bishop's Harbor after episode.
3.... Selected data from Bishop's Harbor during pollution episode

GENERAL DISCUSSION

Early in the start of the Manatee County Pollution Control program it was decided that the marine environment in Bishop's Harbor and the Piney Point area of the county needed to be monitored. If the new Borden Chemical plant was to discharge treated waste water.....or if an accidental spill of chemical wastes were to be discharged or reach Bishop's Harbor, the fish life and undoubtedly the food chain would be affected. Working closely with Jim Sykes, Director, and Jack Taylor, Marine Biologist, of the Department of the Interior's Commercial Fisheries operations at Saint Petersburg Beach, it was decided to establish "barnacle bucket" monitoring stations in the Piney Point area. Most of the discharge from the new Borden plant goes into Bishop's Harbor, although under unusually high run-off from rainfall it is possible that a portion of the waste could go into Red Fish Creek. These two stations were established, and because of the new port being considered for Manatee County to be located near the old Ferry Landing at Piney Point, a third station was located in this area.

"Barnacle buckets" consisted of gallon size mayonnaise glass jars suspended from pilings at the three stations. The jars were changed monthly from July 1966 to June 1967. This provided background information on a year-round and seasonal basis. This method was reported as having been tried in Texas, and was reported in the literature "The Use of Marine Invertebrates as Indicators of Water Quality" by Donald J. Reish. Our procedure was a modification of this method. By using a bucket instead of a glass plate, not only "clinging" type animals could be collected, but bottom organisms and silt, etc., could be studied. At first, buckets were attached to existing pilings. This did not prove to be satisfactory. Pilings were then jetted into more shallow water, which proved to be much more satisfactory. At this time background samples were collected and analyzed from Bishop's Harbor for dissolved oxygen, pH, fluorides, phosphates, nitrates, etc.

The ditch carrying waste water from Borden's property was being monitored daily at Highway 41 and Buckeye Road. Although the state had set water quality standards according to Chapter 5 of the State Sanitary Code (pH -6.0, fluorides - 40 mg/1, etc) occasionally the discharge was on the acid side of the scale, but was generally satisfactory. At one time, when washing out some phosphoric acid cars, some acid waste had been discharged into Bishop's Harbor. Then on Thursday, August 10th, 1967, the Environmental Engineering Department was notified that heavy run-off from excessive rainfall had caused drainage problems at the Borden plant, and that the acid water in the seepage ditch around the cooling pond had overflowed into Bishop's Harbor. The pH in parts of Bishop's Harbor went as low as 2.0, the dissolved oxygen to zero, and the phosphate and fluorides were well above the background sampling data previously collected and the water quality standards set by the State of Florida for this plant. This episode was well recorded, both at the Borden property line and in Bishop's Harbor. The problem lasted for approximately one week and it was estimated that approximately 500 million gallons of run-off and waste water entered Bishop's Harbor during this period. The Borden Company added lime at the rate of approximately 10 tons per hour in order to try to neutralize the waste.

At this time marine biologists Carl Keeler from the' Manatee Junior College and Ken Woodburn from the Florida Department of Conservation, separately agreed that considerable damage had been done to the marine invertebrates in the harbor.

Following this period "barnacle buckets" were again located at the previously established stations. After a month the buckets for September 1967, after the acid waste entered Bishop's Harbor, were compared with those initial background samples from July 1966. Jack Taylor found that of all the species examined, that only the Mollusca had depreciated considerably. (see tabulation in report)

At this time the Borden Company decided to try to relocate their waste discharge from Bishop's Harbor to a new location in Hillsborough County. Environmental Engineering was opposed to this move. All of the background information for this area was from Bishop's Harbor. Considerable damage had already been done to Bishop's Harbor and it did not seem like a good idea to contaminate another location. It would be very difficult to monitor a plant located in Manatee County, with its waste going into Hillsborough County. A meeting was held with the State Board of Health and it was decided to wait and see how Bishop's Harbor was recovering before making a final decision on effluent discharge relocation.

In order to gain more factual information on the effect of Borden's waste on the marine environment, it was decided to try a bio-assay on the mollusca which the "barnacle buckets" had narrowed down as being the marine group most affected by the waste. Aquarium tanks were set up with various types of animals and varying concentrations of waste materials. The bio-assay technique determines the mean toxic limit at which 50% of the organisms tested are killed by the waste.....this is usually determined for a 24 hour, a 48 hour, and a 72 or 96 hour period.

In addition to moon snails, mussels and conchs from the mollusca being tested, small stone crabs from the crustaceau group were also tested. A very large number of dead crabs were observed during the Borden episode at Bishop's Harbor. Although the "barnacle buckets" did not indicate an appreciable change in the crustaceau group over the background studies, the crabs would only represent one species of the group which was obviously affected.

At first, tests involving different concentrations of phosphoric acid, fluorides, phosphates, pH, and Borden's waste were going to be tested. This started to involve such a work load that the final tests were narrowed down to phosphoric acid, Borden's seepage ditch waste, Borden's recirculated waste water, and Borden's recirculated waste water neutralized to a pH of 6.0 with lime and the supernatant used as the test waste. This last test was to try to simulate the effect of the discharge of effluent from Borden's waste water treatment plant into Bishop's Harbor.

BIO-ASSAY SUMMARY

(TL$_m$ Values)

Moon Snails

Material Tested	Time (hours)					
	24		48		72	
	pH	Conc. (ppm)	pH	Conc. (ppm)	pH	Conc. (ppm)
seepage ditch waste	4.7	23,000	4.9	20,000	5.1	18,000

note: mussels tested for TL$_m$ values for 24,48, and 72 hours did not reach a 50% survival level

BIO-ASSAY SUMMARY
(TLm Values)

MATERIAL	TIME (HRS)											
	24				48				72			
	conchs		crabs		conchs		crabs		conchs		crabs	
	pH	Conc (ppm)	pH	Conc (ppm)	pH	Conc (ppm)	pH	Conc (ppm)	pH	Conc (ppm)	pH	Conc (ppm)
H_3PO_4	-	-	2.65	-	-	-	3.0	-	-	-	3.0	-
Seepage Ditch Waste	4.7	22,000	-	- -	4.7	22,000	-	-	4.7	22,000	-	-
Main Cooling Water Return	6.0	7,000	3.9	17,000	6.0	7,000	3.9	17,000	-	-	3.9	17,000
Cooling Water Return Neutral to pH 6	-	no TLm	-	no Tlm	-	no TLm	-	no TLm	-	no TLm	7.6	27,000

No Tlm means no value reached at concentration tried.

OBSERVATIONS AND CONCLUSIONS

Following the episode of the discharge of seepage ditch waste from the Borden Chemical plant at Piney Point into Bishop's Harbor, bio-assay studies and chemical tests were conducted to find out more about Borden's waste water. The observations from these studies are as follows:

1. "Barnacle bucket" tests indicate that the marine group mollusca were the most affected.

2. Although "barnacle bucket" tests did not indicate serious damage to the group crustaceau, visual observations at Bishop's Harbor indicated large numbers of dead crabs.

3. **Very little difference was observed in concentration versus pH tests on seepage ditch waste and recirculated waste water.**

To reach a pH of 6.0

Type material	Concentration required
Recirculated waste	0.7%
Seepage ditch waste	0.85%

4. **Borden's waste is very highly buffered and large concentrations are required to lower the pH to a value of 2.0, as was observed in Bishop's Harbor. This in itself indicates that tremendous quantities of waste must have been discharged during the recent episode.**

5. Crabs are very sensitive to acid waste, such as Borden's recirculation water or seepage ditch water. TL_{50} values are not reached using crabs in neutralized waste water until 72 hours and then only at high concentrations (27,000ppm).

6. The mollusca group is susceptible to Borden's recirculation water or seepage ditch water, but relatively unaffected by neutralized recirculation waste water.

7. TL_m values for different materials are listed in the bio-assay summary. Included is the time, the pH, and the concentration that the TL_m occurs.

8. The Florida State Board of Health made an excellent choice in selecting a pH of 6.0 for the standard of water quality for the discharge of neutralized waste water.

9. Marine invertebrates belonging to the mollusca

group, which has been shown most sensitive to Borden's waste waters, can be safely protected by neutralizing the effluent stream to a pH of 6.0 with lime before discharge.

10. Crabs belonging to the crustaceau group can be protected by proper waste neutralization before discharge.

COMMENTS AND RECOMMENDATIONS

After reviewing the data gathered during the bio-assay studies of various waste waters, it is apparent that the Borden Chemical Company can continue to discharge its treated effluent into Bishop's Harbor provided:

1. Dykes are properly constructed.

2. Dykes are properly patrolled.

3. Proper monitoring of waste water is carried out and reports are submitted to the Florida State Board of Health through the Manatee County Health Department on a monthly basis.

4. Chemical quality of the effluent discharge meets the approval requirements of the FSBH approval.

All of the above are being carried out with the exception that modification needs to be made to the waste treatment facility, and monthly reports need to be submitted.

It is the opinion of this agency that the Borden Chemical Company should continue to discharge its waste into Bishop's Harbor, so that it can be properly monitored.

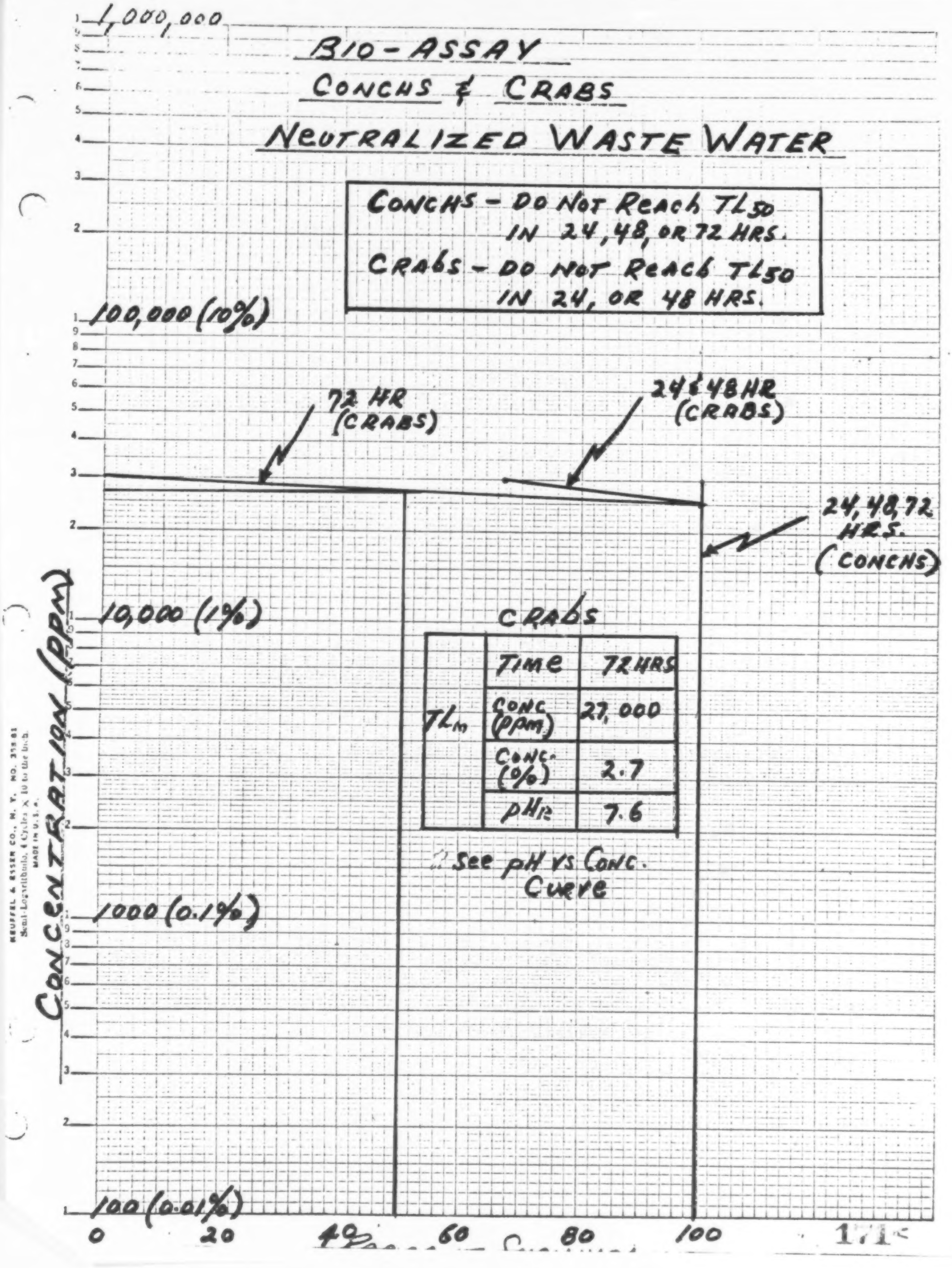
DISCUSSION OF RESULTS

At first it was decided to test mollusks in different solutions of phosphoric acid, phosphates, fluorides, and sulfates, but after starting out with different concentrations of phosphoric acid on stone crabs, it was decided that it was going to be too ambitious a project, and the study was limited to mollusks, (principally conchs, although a few tests were run using mussels and moon snails) and stone crabs, tested for TL_m in solutions of different wastes from the Borden Chemical Company plant. These wastes consisted of seepage ditch waste, recirculated waste water, and neutralized recirculated waste water (waste was neutralized to a pH of 6.0, settled, and the supernatant used as the test solution). The mollusks were first tried in different strength solutions of seepage ditch waste, and it was found that the mussels were the least susceptible to the waste, the moon snails were rather sensitive to the waste, and the conchs, although TL_m concentration was about the same as the moon snails, retained the approximate same TL_m for 24 hours and 72 hours. It was therefore decided to use only conchs in the future experiments. Stone crabs were also used in most of the experiments, because, although the "barnacle bucket" tests indicated only large biological changes in mollusks, crabs were virtually wiped out during the Bishop's Harbor episode. Stone crabs and conchs were then tested in different strength solutions of recirculated waste water, and neutralized waste water. The recirculated waste water is the fluid that is discharge through the waste treatment plant, after being limed, during excessive rainfall or when the operating level in the gypsum or cooling ponds needs to be lowered.

We consider the values accurate, although approximate. When the concentration of waste was plotted on four cycle semi-log paper against percent survival, it was noted that only a few points were involved in the median range. This does not affect the accuracy of the test, but does place the exact TL_m values either slightly higher, or lower than the value indicated.

Additional tests were conducted on the two wastes to determine curves for the concentration of waste in comparison with the acidity (pH) in salt water.

BIO-ASSAY
CONCHS & CRABS
NEUTRALIZED WASTE WATER



CONCHS – DO NOT REACH TL_{50} IN 24, 48, OR 72 HRS.

CRABS – DO NOT REACH TL_{50} IN 24, OR 48 HRS.

CRABS

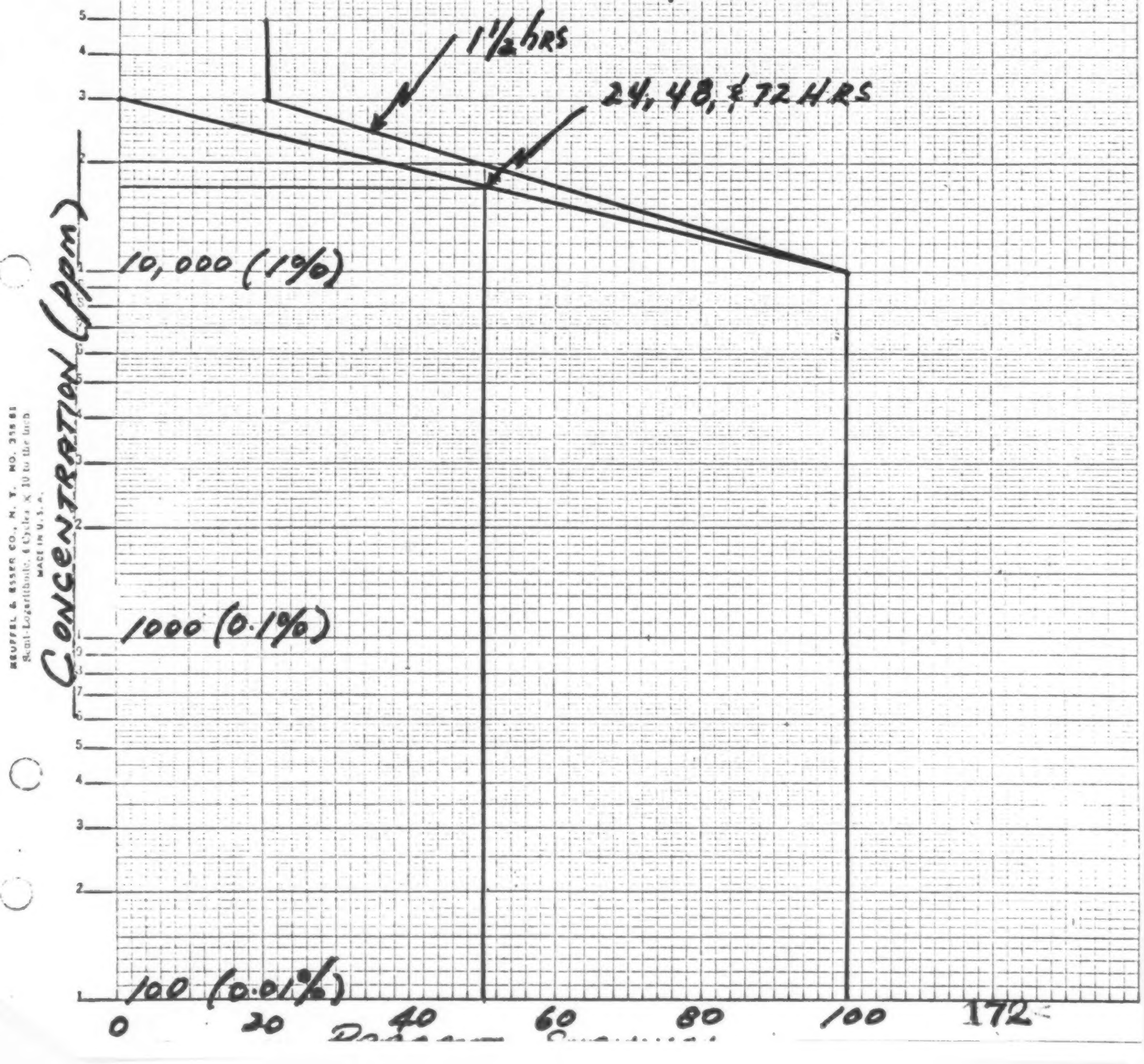
	TIME	72 HRS
TL_m	CONC. (ppm)	27,000
	CONC. (%)	2.7
	pH[1]	7.6

[1] See pH vs CONC. Curve

BIO-ASSAY
STONE CRABS
MAIN COOLING WATER RETURN

	TIME	1½ HRS	24, 48, 72 HRS
TL_{50}	CONC (PPM)	20,000	17,000
	CONC (%)	2.0	1.7
	pH	3.6	3.9

see pH vs Conc Curve



KEUFFEL & ESSER CO., N. Y. NO. 358 81
Semi-Logarithmic, 4 Cycles X 10 to the inch
MADE IN U.S.A.

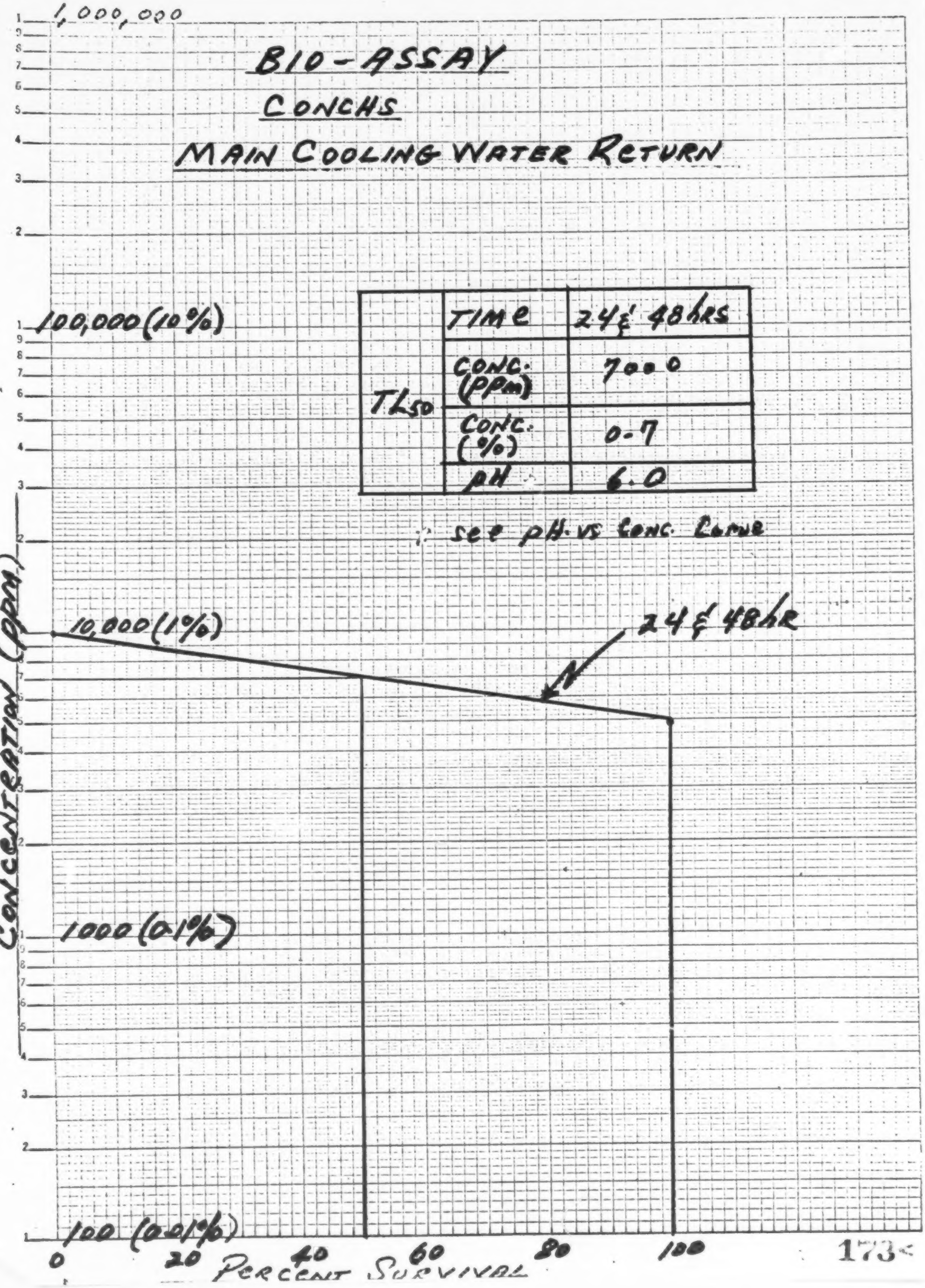
BIO-ASSAY

CONCHS

MAIN COOLING WATER RETURN

TL50	TIME	24 & 48 hrs
	CONC. (PPM)	7000
	CONC. (%)	0.7
	pH *	6.0

* see pH vs Conc. Curve



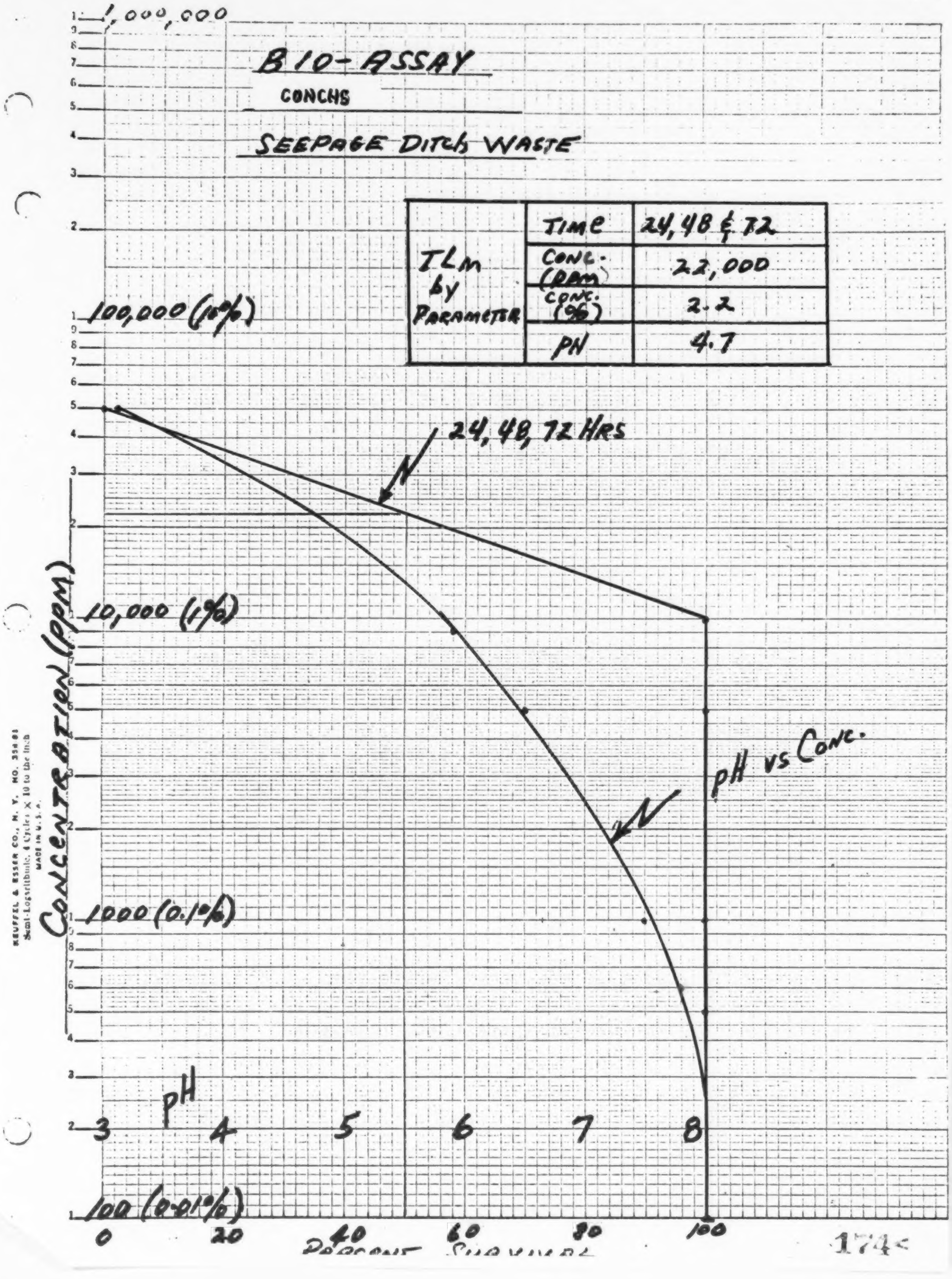
KEUFFEL & ESSER CO., N.Y. NO. 358-81
Semi-Logarithmic, 4 Cycles x 10 to the inch.
MADE IN U.S.A.

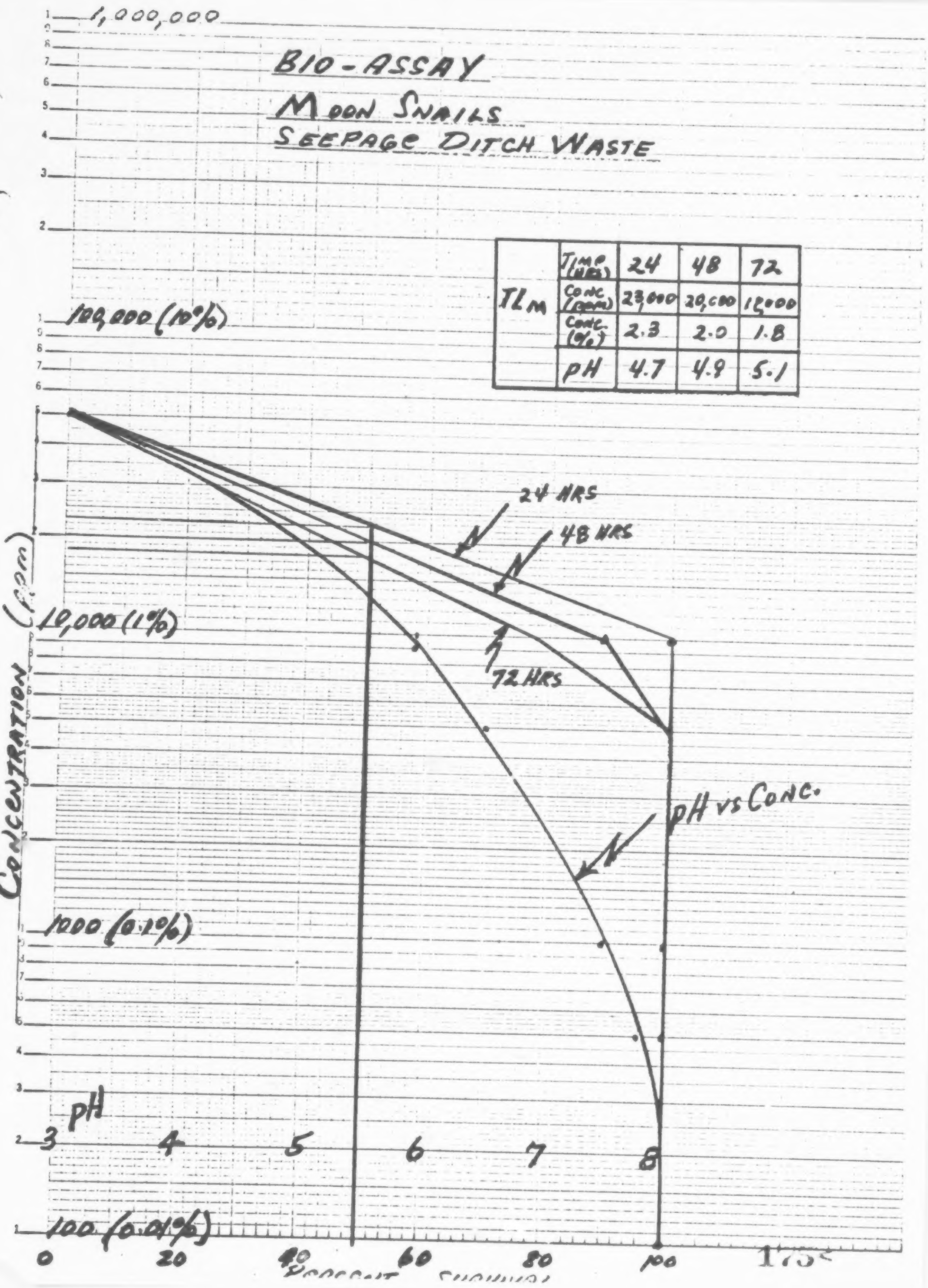
BIO-ASSAY

CONCHS

SEEPAGE DITCH WASTE

TLm by PARAMETER	TIME	24, 48 & 72
	CONC. (PPM)	22,000
	CONC. (%)	2.2
	PH	4.7





BIO-ASSAY

MOON SNAILS

SEEPAGE DITCH WASTE

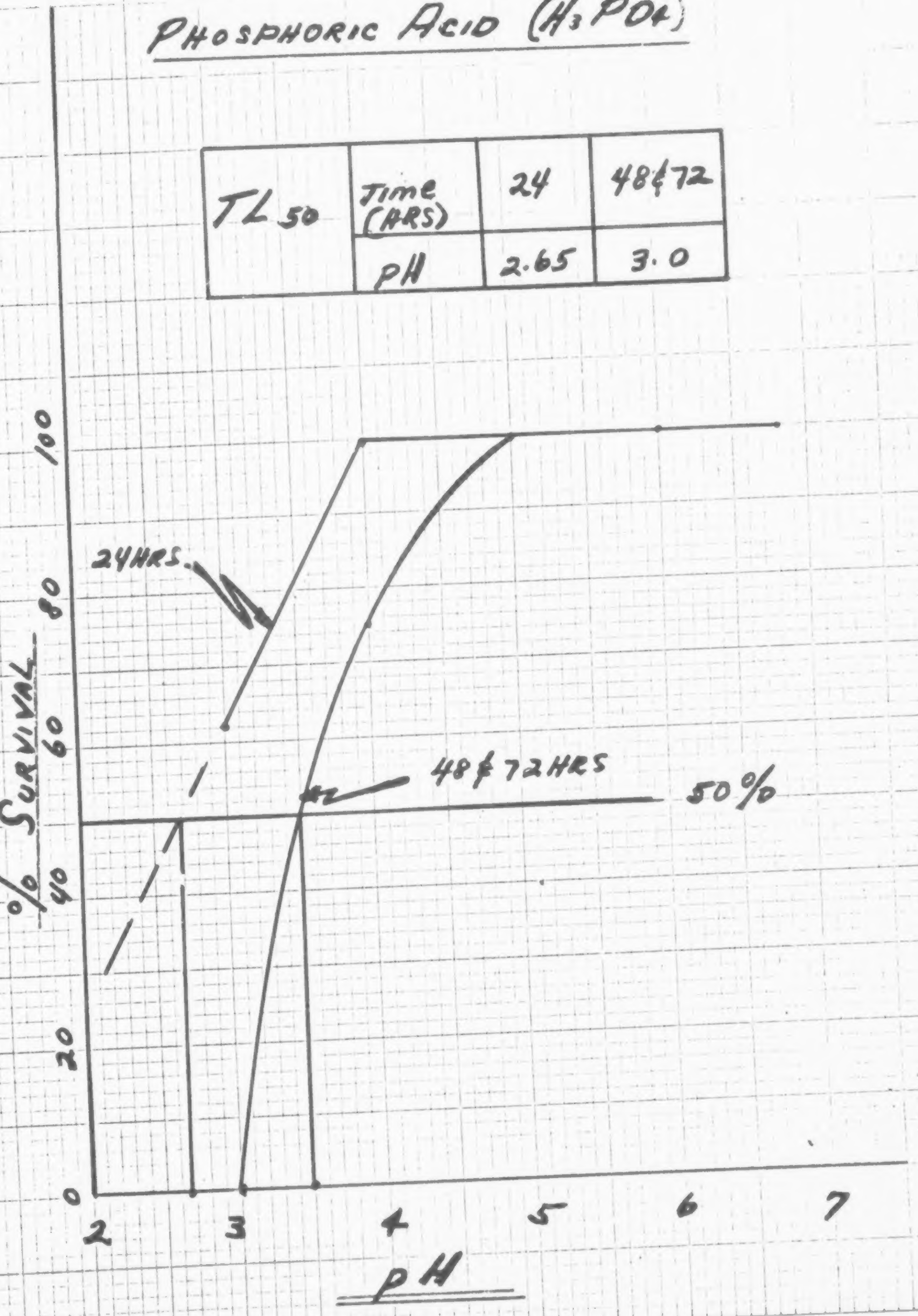
TLm	Time (HRS)	24	48	72
	Conc (ppm)	23,000	20,000	18,000
	Conc. (%)	2.3	2.0	1.8
	pH	4.7	4.9	5.1

KEUFFEL & ESSER CO., N.Y. NO. 359-81
Semi-Logarithmic, 4 Cycles X 10 to the inch
MADE IN U.S.A.

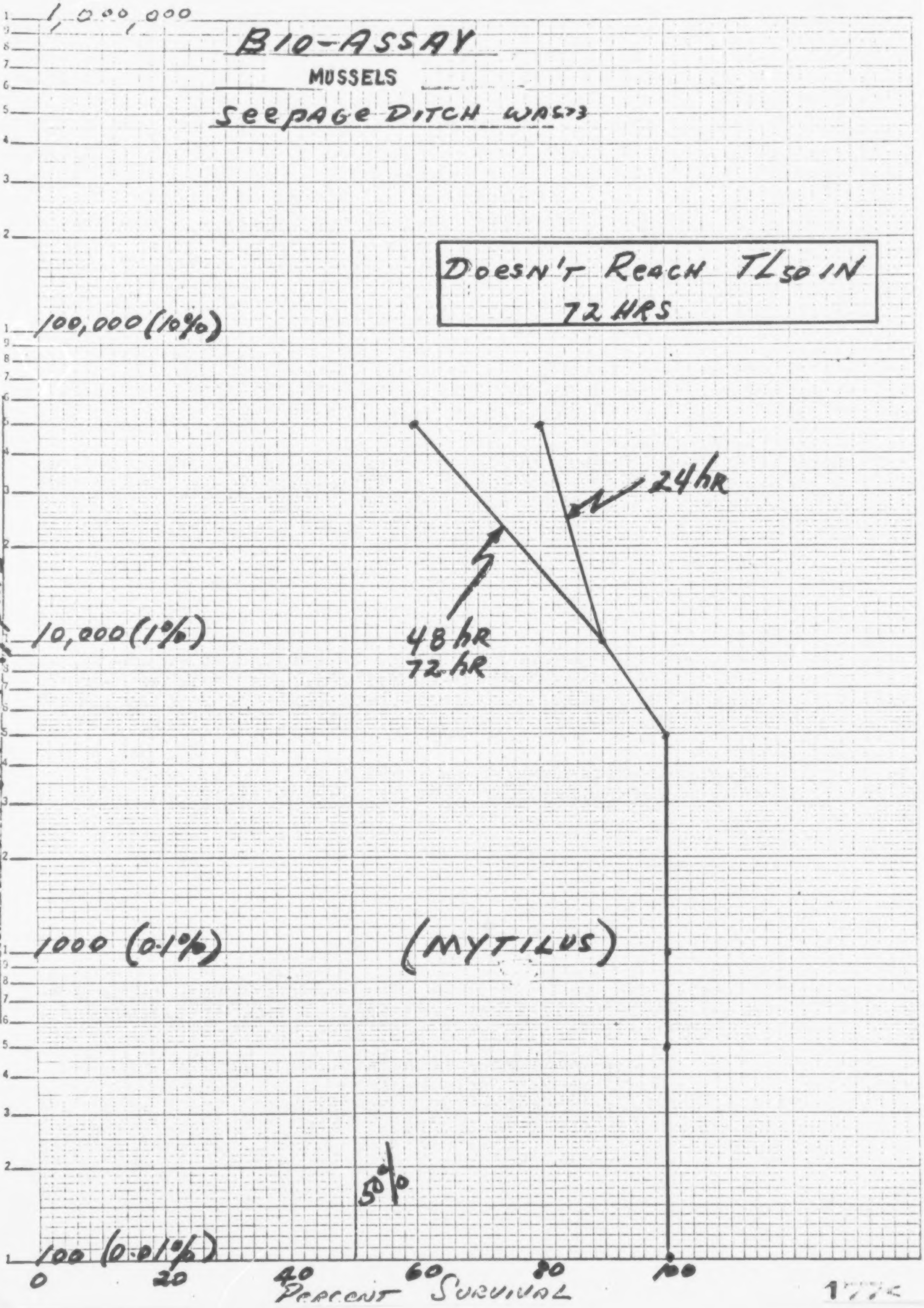
12-280

BIO - ASSAY
STONE CRABS
PHOSPHORIC ACID (H_3PO_4)

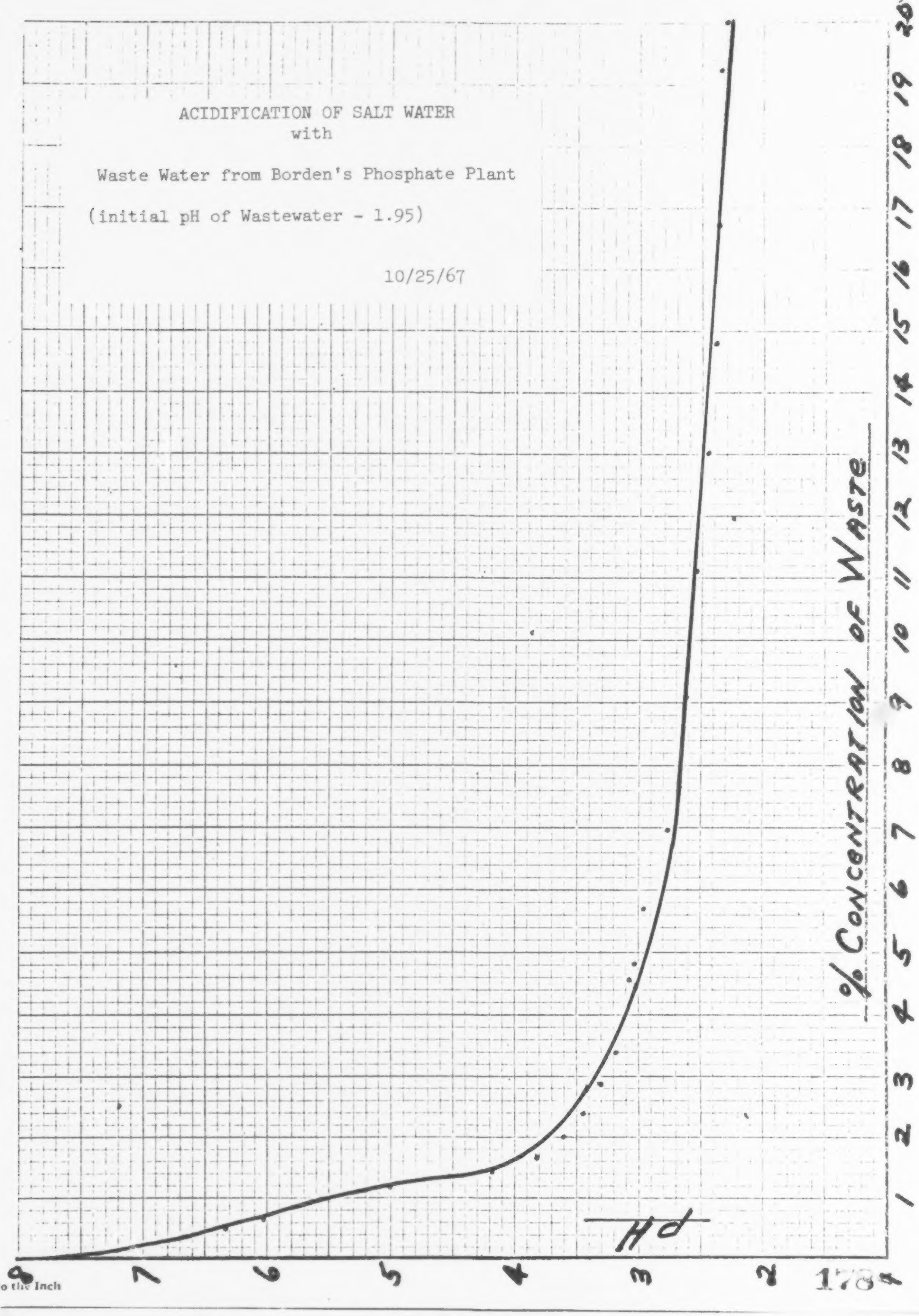
TL 50	Time (HRS)	24	48 & 72
	pH	2.65	3.0



ares to the Inch


BIO-ASSAY
MUSSELS
SEEPAGE DITCH WASTE
DOESN'T REACH TL50 IN 72 HRS
1,000,000
100,000 (10%)
10,000 (1%)
1000 (0.1%)
100 (0.01%)
CONCENTRATION (ppm)
0
20
40
60
80
100
PERCENT SURVIVAL
24 hr
48 hr
72 hr
(MYTILUS)
50%
KEUFFEL & ESSER CO., N. Y. NO. 359-81
Semi-Logarithmic, 4 Cycles x 10 to the inch
MADE IN U.S.A.

12-280



ACIDIFICATION OF SALT WATER
with

Waste Water from Borden's Phosphate Plant

(initial pH of Wastewater - 1.95)

10/25/67

res to the Inch

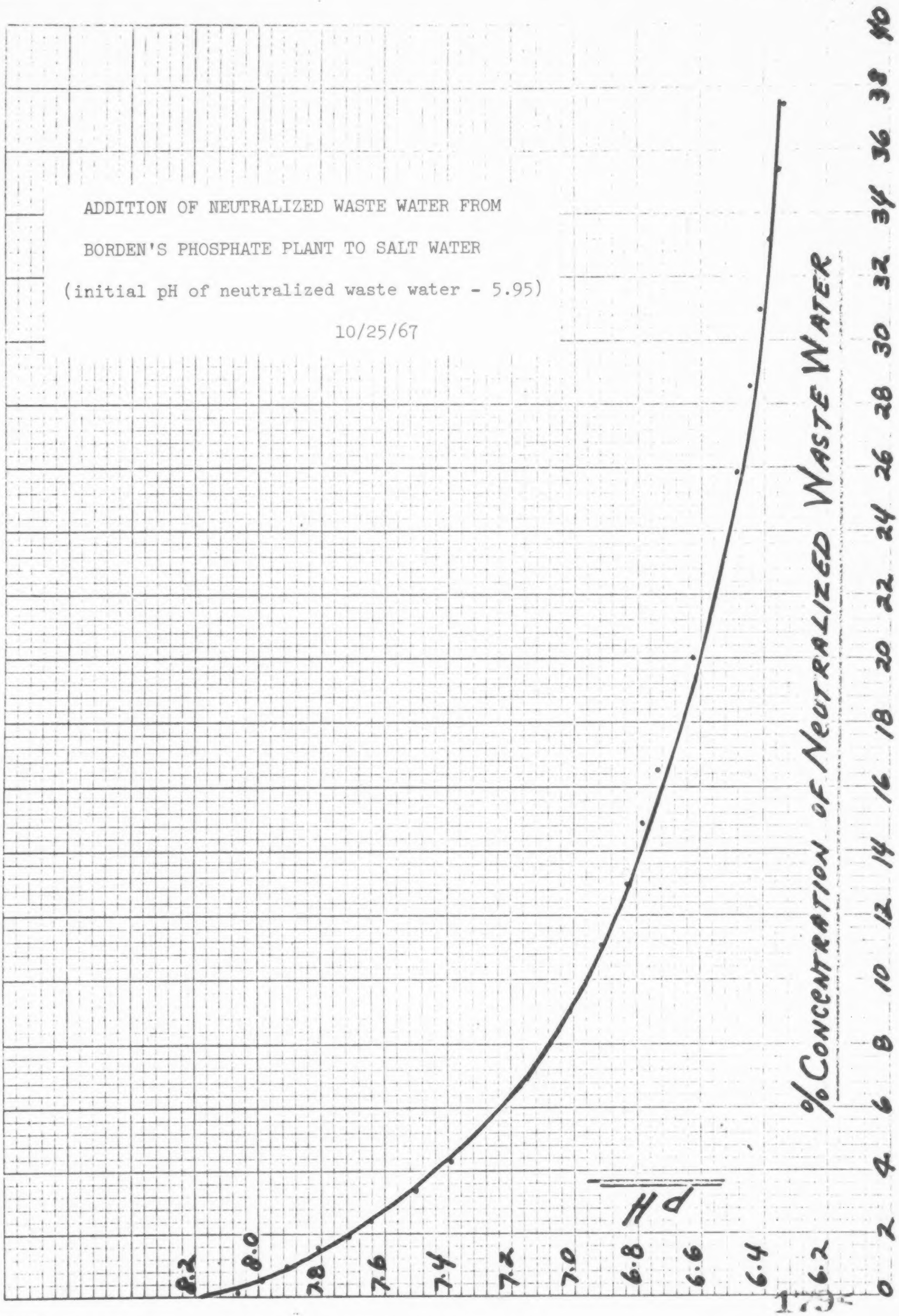
12-280

ADDITION OF NEUTRALIZED WASTE WATER FROM

BORDEN'S PHOSPHATE PLANT TO SALT WATER

(initial pH of neutralized waste water - 5.95)

10/25/67



uares to the Inch

CRABS VS H_3PO_4

BIOASSAY RECORD SHEET

SEC 151
(6-58)

Series: 1 Company: Borden Chem Co Date: Oct 1967

Technician: Env. Eng. Lab. Starting Hour: —

Material being tested: CRABS VS 10N H_3PO_4

Source: Comm. Chemicals

Source of dilution water: Salt water from Piney Point

Test species: CRABS Temp. range:

No. individuals per concentration: 8

STARTING TIME 2:30

1/1	Start	1	2	3	4	5	6		
Crabs/Sample Dilution		8	8	8	8	8			Control 8
DO									
pH		3.0	4.0	5.0	6.0	6.8			8.1
Hardness									
Other | ml 10N H_3PO_4		3.14	1.78	1.58	0.80	0.28			
	24 hours								
No surviving		5	8	8	8	8			8
% survival		63	100	100	100	100			100
DO									
pH		6.6	7.2	7.4	7.5	7.7			7.8
Other Readjusted pH to		3.2	4.0	4.9	6.0	6.9			
ml	48 hours	3.5	2.7	2.4	1.2	0.2			10N H_3PO_4
No surviving		0	6	8	8	8			7 (1 [illegible])
% survival		0	75	100	100	100			100
DO									
pH		5.1	6.3	6.6	7.3	7.9			8.0
Other									
	96 hours								
No surviving		0	6	8	8	7 [illegible]			7
% survival		0	75	100	100	100			100
DO									
pH		—	6.6	7.0	7.4	8.0			8.0
Other									

BI. BIO. met. 9. 4. 58

Conchs vs Seepage Ditch Waste

SEC 151
(6-58)

BIOASSAY RECORD SHEET

Series: 2 Company: Borden Chem. Co. Date: Oct 1
Technician: Env. Eng. Lab. Starting Hour: —
Material being tested: Seepage Ditch Waste
Source: Borden Chemical Company
Source of dilution water: Salt water from Piney Point
Test species: Conchs Temp. range: —
No. individuals per concentration: Ten (10)

	Start								
Dilution:	Waste used	0.01%	0.05%	0.1%	0.5%	1.0%	5.0%		Control
DO									
pH	2.1	8.0	7.8	7.5	6.5	5.9	3.1		8.0
Hardness									
Other (ppm)	—	100	500	1000	5000	10,000	50,000		
	24 hours								
No surviving		10	10	10	10	10	0		10
% survival		100	100	100	100	100	0		100
DO									
pH		7.9	7.8	7.7	7.6	7.0	3.4		8.0
Other									
	48 hours								
No surviving		10	10	10	10	10	0		10
% survival		100	100	100	100	100	0		100
DO									
pH		—	—	—	—	—	—		—
Other									
	72 hours								
No surviving		10	10	10	10	10	0		10
% survival		100	100	100	100	100	0		100
DO									
pH		7.9	7.8	7.8	7.5	7.3	3.7		8.0
Other									

BI. BIO. met. 9. 4. 58

Moon Snails VS Seepage Ditch Waste

SEC 151
(6-58)

BIOASSAY RECORD SHEET

Series: 2 Company: Borden Chem Co Date: Oct-1957
Technician: Env. Eng. Lab. Starting Hour: ——
Material being tested: Seepage Ditch Waste
Source: Borden Chem. Co.
Source of dilution water: Salt water from Piney Point
Test species: Moon Snails Temp. range: ——
No. individuals per concentration: Nine (9)

	Start								
Dilution:	Waste used	0.01%	0.05%	0.1%	0.5%	1.0%	5.0%		Control
DO									
pH	2.1	8.0	7.8	7.5	6.5	5.9	3.1		8.0
Hardness									
Other (ppm)	—	100	500	1000	5000	10,000	50,000		
	24 hours								
No surviving		9	9	9	9	9	0		9
% survival		100	100	100	100	100	0		100
DO									
pH		7.9	7.8	7.7	7.6	7.0	3.4		8.0
Other									
	48 hours								
No surviving		9	9	9	9	8	0		9
% survival		100	100	100	100	89	0		100
DO									
pH		—	—	—	—	—	—		—
Other									
	72 ~~48~~ hours								
No surviving		9	9	9	9	7	0		9
% survival		100	100	100	100	78	0		100
DO									
pH		7.9	7.8	7.8	7.5	7.3	3.7		8.0
Other									

BI. BIO. met. 9. 4. 58

SEC 151
(6-56)

BIOASSAY RECORD SHEET

Series: 2 Company: Borden Chem Co Date: OCT 196

Technician: ENV. Eng. Lab. Starting Hour: —

Material being tested: Seepage Ditch Waste

Source: Borden Chemical Company

Source of dilution water: Salt water from Piney Point

Test species: Mussels (Mytilus) Temp. range: —

No. individuals per concentration:

	Start								
Dilution:	waste used	0.01%	0.05%	0.1%	0.5%	1.0%	5.0%		Control
DO									
pH	2.1	8.0	7.8	7.5	6.3	5.9	3.1		8.0
Hardness									
Other (ppm)	—	100	500	1000	5000	10,000	50,000		—
	24 hours								
No surviving		10	10	10	10	9	8		10
% survival		100	100	100	100	90	80		100
DO									
pH		7.9	7.8	7.7	7.6	7.0	3.4		8.0
Other									
	48 hours								
No surviving		10	9	10	10	9	6		10
% survival		100	90	100	100	90	60		100
DO									
pH		—	—	—	—	—	—		—
Other									
	72 ~~24~~ hours								
No surviving		10	10(9)	10	10	9	5		10
% survival		100	100	100	100	90	50		100
DO									
pH		7.9	7.8	7.8	7.5	7.3	3.7		8.0
Other									

BI. BIO. met. 9. 4. 58

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SEC 151
(6-58)

BIOASSAY RECORD SHEET

Series: 3 Company: Borden Chem. Co. Date: Oct 17, 1

Technician: Env. Eng. Lab. Starting Hour: ——

Material being tested: Main waste water Return

Source: Borden Chemical Co – main cooling water Return

Source of dilution water: Salt water from Piney Point

Test species: Conchs Temp. range: ——

No. individuals per concentration: Seven (7)

	Start				10-17-67				
Dilution:	waste cisco	1/2%	1%	1 1/2%	2%	2 1/2%	3%		Control
DO									
pH	1.95	6.5	5.8	4.3	3.6	3.3	3.5		7.9
Hardness									
Other									
	24 hours				10-18-67				
No surviving		7	0	0	0	0	0		7
% survival		100	0	0	0	0	0		100
DO									
pH		6.8	5.5	4.5	4.0	3.8	3.5		7
Other									
	48 hours				10-19-67				
No surviving		7	0	0	0	0	0		7
% survival		100	0	0	0	0	0		100
DO									
pH		7.4	6.7	5.6	3.9	3.7	3.4		7.8
Other									
	96 hours								
No surviving									
% survival									
DO									
pH									
Other									

BI. BIO. met. 9. 4. 58

SEC 151
(6-58)

BIOASSAY RECORD SHEET

Series: 3 Company: Borden Chem. Co. Date: Oct 16, 196

Technician: ENV. ENG. Lab. Starting Hour: ____

Material being tested: Main WASTE WATER [illegible]

Source: Borden Chem Co – Main Cooling Water Canal

Source of dilution water: SALT WATER from Piney Point

Test species: STONE CRABS Temp. range: 80°F

No. individuals per concentration: (5) Five

Start 3:00pm 10/16/67

Dilution:	[illegible]		1%		3%		5%		Control
DO									
pH	1.95		5.8		3.3		3.0		[illegible]
Hardness									
Other									
(1½) hours									
No surviving	–		5		1		1		5
% survival			100		20		20		100
DO									
pH									
Other									
(24) hours				10-17-67					
No surviving			4 1 eaten		0		0		5
% survival			100		0		0		100
DO									
pH									
Other									
(48) hours				10-18-67					
No surviving			4		0		0		5
% survival			100		0		0		100
DO									
pH									
Other									

10-19-67 BI. BIO. met. 9. 4. 58

(72) Hrs	4/100	0/0	0/0	4/100 (1

SEC 151
(6-58)

BIOASSAY RECORD SHEET

Series: 4 Company: Borden Chem. Co. Date: Oct 17, 19

Technician: Environmental Engineering Laboratory Starting Hour: —

Material being tested: Neutralized Wastewater (Limed)

Source: Main Cooling Water Return

Source of dilution water: Salt water from Piney Point

Test species: Conchs and Crabs Temp. range: —

No. individuals per concentration: 8 Conchs — 3 Crabs

	Start			10-24-67					
Dilution:		0.5%	1.0%	1.5%	2.0%	2.5%	3.0%		Control
DO									
pH		8.1	8.0	8.0	7.9	7.8	7.7		8.1
Hardness									
Other									
	24 hours			10-25-67					
No surviving		8C 3Cr	8C 3Cr	8C 3Cr	8C 3Cr	8C 3Cr	8C 2Cr		8C 3Cr
% survival		100	100	100	100	100	100 67		100
DO									
pH		8.0	8.0	7.9	7.9	8.1	7.9		8.1
Other									
	48 hours			10-26-67					
No surviving		8C 3Cr	8C 3Cr	8C 3Cr	8C 3Cr	8C 3Cr	8C 2Cr		8C 3Cr
% survival		100	100	100	100	100	100 67		100
DO									
pH		7.9	7.9	7.9	7.9	8.0	8.0		7.9
Other									
	72 96 hours			10-27-67					
No surviving		8C 3Cr	8C 3Cr	8C 3Cr	8C 3Cr	8C 3Cr	8C 0Cr		8C 3Cr
% survival		100	100	100	100	100	100 zero		100
DO									
pH		7.9	8.0	8.0	8.0	8.0	8.0		8.0
Other									

BI. BIO. met. 9.4.58

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES
BIOLOGICAL LABORATORY
75-33RD AVENUE
ST. PETERSBURG BEACH, FLORIDA 33706

RECEIVED
OCT 5 1967
MANATEE CO.
HEALTH
DEPT.

October 4, 1967

Mr. Frank L. Cross, Jr.
Sanitary Engineer
Manatee County Health Department
202 - 6th Avenue East
Bradenton, Florida 33505

Dear Frank:

In connection with recent pollution of Bishop's Harbor by Borden Chemical Company, we have made a preliminary analysis of the "Barnacle Bucket" sampler for September 1967, and compared results with those from the sampler for July 1966 (enclosure 1).

Even though the numbers of species listed under each group may not be precise, I feel the listings are reasonably accurate and indicate some changes in structure of the invertebrate community following pollution. You will notice that the 20 percent reduction in numbers of species in the September 1967 sample is due almost entirely to decline of mollusks. I'm not sure what this means. Perhaps there was an accumulation of sediment in the 1966 sampler that provided suitable substrate for burrowing mollusks. On the other hand, sediment or none, one would expect fouling mollusks on both samplers and there were no oysters, jingle shells, mussels, or boat shells on the 1967 "Barnacle Bucket." Because of their substantial calcium metabolism, I suspect the mollusks are a good indicator of pH, and my guess is that the pH reduction that occurred has had a limiting influence on mollusks in Bishop's Harbor. Perhaps you can check out my supposition by examining hard substrates in the Harbor. Also, you might get Carl Keeler or someone to hold selected species of mollusks in circulating sea water and adjust pH to determine respective tolerances.

I hope this helps.

Sincerely yours,

Jack

John L. Taylor
Fishery Biologist (Research)

Enclosure

Group	Approximate number of species	
	July 1966	September 1967
Cnidaria	2	2
Platyhelminthes	1	1
Rhynchocoela	1	2
Nematoda	0	1
Annelida	5	7
Mollusca	12	2
Arthropoda		
Crabs	6	4
Amphipods	2	3
Isopods	2	2
Barnacles	2	2
Ectoprocta	0	1
Urochordata	1	1
Total species	34	28

TO: Sen. R. Hodges DATE: 1 September 1967

FROM: Ken Woodburn

Re: Dike break at Borden Chemical Co., resultant discharge of acid wastes, and degradation of water quality in Bishop Harbor, Manatee County

At Bob Ingle's request, I inspected Bishop Harbor and the drainage and seepage ditches at the chemical plant yesterday and also talked with Frank Cross, Manatee County Sanitary Engineer, Professor Carl Keeler of Manatee Jr. College, and Wayne Mead, a local commercial fishing official and spokesman.

Based on my inspections, interviews and perusal of the report of August 21 by the Manatee County Health Department to the Manatee County Commission, I offer the following comments, conclusions and recommendations:

Water quality standards established by the State were violated for at least one week, particularly for pH, fluorides, phosphates and dissolved oxygen. Said degradation occurred in the main drainage ditch from Borden's chemical plant to Bishop Harbor and in Bishop Harbor, an estuarine habitat.

Heavy rains plus an inadequate County drainage ditch caused an overflow of drainage water into the Borden's seepage ditches around the cooling pond, a resultant breakage in the dike between the seepage and drainage ditches, and an uncontrolled discharge of acid wastes from the seepage ditch into the drainage ditch. This acid waste water was then transported by the main drainage ditch into Bishop Harbor. The company did not notify the County until two days after the dike broke. Borden added 10 tons of lime per hour to neutralize the acid waste water until it was asked to stop by the County after the pH rose to more than 11 in the drainage ditch.

The company has repaired and raised the earthen dike between its seepage canal and the drainage canal. It has realigned the main drainage canal entirely along Buckeye Road where it now exits directly under U. S. Highway 41. This direct alignment eliminates an undesirable road ditch through Borden property.

Marine animals are scarce in Bishop Harbor. Professor Hacker observed dead blue crabs and bottom fishes during his investigations conducted while the company was liming its acid wastes flowing into the drainage canal and then the Harbor. Unfortunately, no species list of dead animals was compiled immediately when the dike broke and the Harbor was first affected. No State or Federal biologists from water quality or conservation agencies were brought into this matter during the most critical period. I found no live large or small oysters in sampling at six random spots in Bishop Harbor, particularly at the eastern end and in Northeast Head where the acid effluents discharge. The water in Northeast Head is still discolored, smelly and scummy. Besides dead oysters, I also found dead crown conchs, mussels and barnacles in the eastern section of Bishop Harbor. I saw no schools of mullet at high tide when they should be common. Wayne Mead reports a decline in fishes and mullet catches from Bishop Harbor since the Borden Plant began operations.

I am attaching a copy of recommendations prepared jointly by County and Borden officials. I wholeheartedly concur in these recommendations. Numbers 2 and 3 have already been acted on by the company as I described earlier. I believe Number 5 is especially important because hurricanes could deliver in the same period two to three times the rain that precipitated the recent fiasco.

It seems ironic to me that inadequate drainage ditches and earthen dikes could apparently thwart the best designs and efforts of a modern chemical plant, the County and the State in preserving water quality in Bishop Harbor.

This episode stresses again the dependence of most of peninsular Florida on adequate drainage for industrial, agricultural and residential development and the need for comprehensive plans and actions to concurrently protect fish and wildlife habitats.

KDW:jw
cc: Mr. R. M. Ingle

Press Release
Aug 16, 1967

This release was prepared jointly by the Manatee County Engineering Department, the County Environmental Health Department and The Borden Chemical Company and given to the following listed newspapers:

AUG 22 1967
[illegible]

The Bradenton Herald
Sarasota Herald-Tribune
Tampa Tribune
St. Petersburg Times

A cooperative study of the problems that created the recent incident in Bishop's Harbor by principals of the County Engineering Department, County Health and Pollution Control Department and The Borden Chemical Company has resulted in the following recommendations:

1. The storm drain system, which drains not only The Borden Chemical Company plant area but various farms in the area, should at all times be kept free of weeds and debris that may restrict this natural drainage into Bishop's Harbor.

2. The earthen dikes that separate this storm drain system from The Borden Chemical Company's recirculating captive system should be raised and seeded to prevent the possibility of further leakage or erosion.

3. The storm drain system should be realigned in its entirety along Buckeye Road exiting directly under Highway 41 into the County's storm drain system and not as present, meandering back through The Borden Chemical Company's property.

4. Various storm drain canals and ditches should be widened and deepened in order to carry the run-off.

5. Until after the hurricane season the water level in both the gypsum and cooling ponds will be kept at minimum operating level in order to accomodate more than normal rainfall.

It can be said that at this time all of the above recommendations are going to be put into effect through the cooperative efforts of The Borden Chemical Company and the County Engineering Department. This work is in progress at the present time and will continue as rapidly as possible until all the above recommendations are completed.

If further study and the results of any tests indicate that further action is needed, it can be depended upon that with the cooperation of the groups involved, a sound and safe solution will be found and put into effect.

REPORT ON

WATER POLLUTION INVESTIGATION

COVERING DAM BREAK AT BORDEN CHEMICAL CO. AFFECTING BISHOP'S HARBOR

FRANK L. CROSS, JR.
ENVIRONMENTAL ENGINEERING
MANATEE COUNTY HEALTH DEPARTMENT
BRADENTON, FLORIDA

MANATEE COUNTY HEALTH DEPARTMENT
202 SIXTH AVENUE, EAST, BRADENTON, FLORIDA 33505 - TELEPHONE 746-4181

GEORGE M. DAME, M.D., DIRECTOR

August 21, 1967

Board of County Commissioners
Courthouse
Bradenton, Florida

Gentlemen:

The following report indicates information concerning the recent discharge of industrial waste at the Borden Chemical Company Complex at Piney Point into Bishop's Harbor.

Chemical data has been tabulated, showing degradation of the water quality, both in the ditch leading from the plant and in Bishop's Harbor.

Also included is a newspaper account of an investigation by marine biologist Carl Keeler who has suggested that serious consideration be given to the recommendations of this report.

Very truly yours,

Frank L. Cross, Jr.

Frank L. Cross, Jr.
Sanitary Engineer

FLC;fw

CC: Mr. Vince Patton, through Mr. David B. Lee
Governor Claude Kirk
Dr. George Dame
Mr. Randolph Snell

INTRODUCTION

Due to the heavy rains over the weekend of August 6th, 1967, water in the drainage ditch north and adjacent to Buckeye Road rose to such an extent that it overflowed into the seepage canal surrounding the Borden complex at Piney Point. Water flowed down this canal to the west, overflowing a seepage ditch, back into the drainage canal and then on into Bishop's Harbor. The Borden plant was shut down for 2 days because of this problem, however, the Health Department was not notified until Thursday, August 10th.

Samples were first collected around 4 P. M. on August 10th and from then on. Continued rains made it difficult to make repairs at the Borden plant and the pollution was not stopped until the water receded on August 18th. During this period, Borden's was adding lime at the ditch at the plant,at the rate of some 10 tons per hour. Samples were collected in the ditch and in Bishop's Harbor on a number of occasions and Carl Keeler, marine biologist from Manatee Junior College, together with Ross Socolof, ichthyologist, made a biological investigation of Bishop's Harbor to determine immediate and future damage.

In talking with commercial fisherman, Mr. Wayne Mead, he has indicated that a million pounds of fish are taken yearly from Bishop's Harbor and that the average sale price per pound is 10 cents, which would amount to some $100,000.00.

CONCLUSIONS

After careful study of the data collected during this pollution problem at Piney Point, it is recommended that:

1. The discharge of industrial waste from Borden's seepage ditch surrounding the cooling pond, although not entirely their fault, was still their responsibility.

2. The water quality in the ditch leaving the Borden property, and in Bishop's Harbor is degraded well below the water quality standards established in Chapter 5 of the State Sanitary Code and below those standards under the approval of the State Board of Health for the discharge of industrial waste from the chemical complex (this includes pH, fluorides, and phosphates).

3. Severe damage has occured to the biological structure at Bishop's Harbor and according to the marine biologist who investigated the situation, it will take longer than a year to recover.

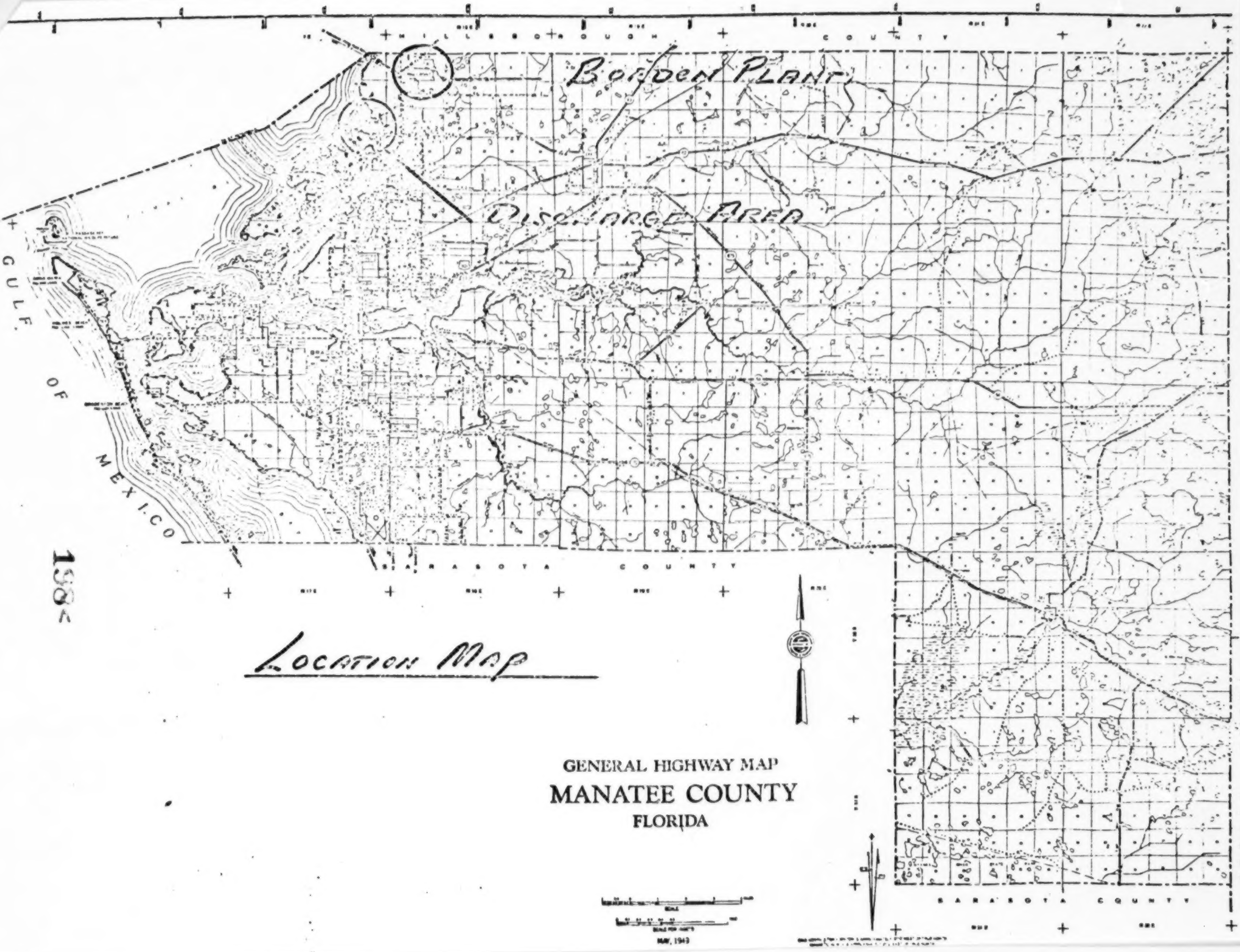
RECOMMENDATIONS

It is hereby recommended that:

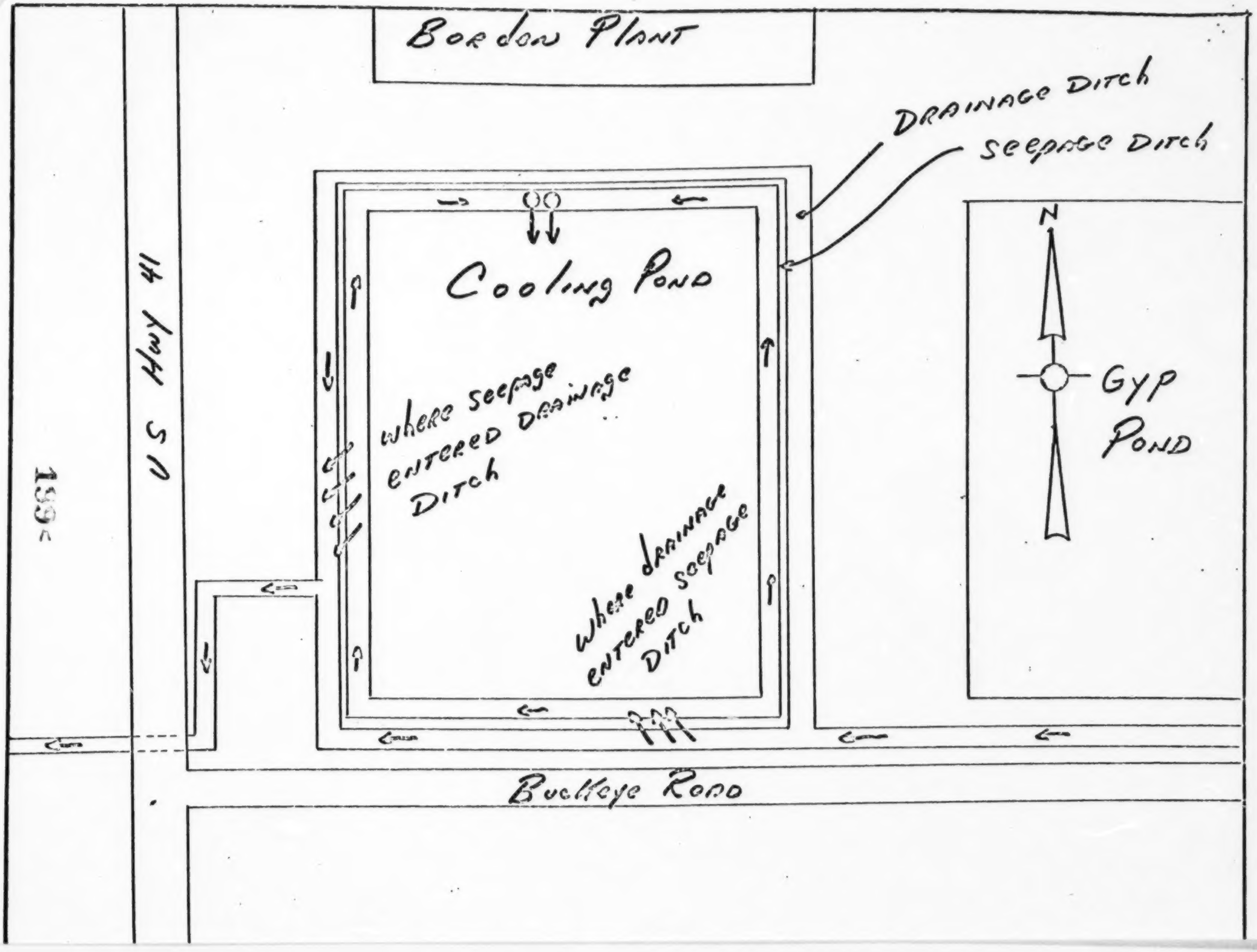
1. The 5 items in the press release by Borden's concerning corrective measures, be carried out as rapidly as possible.

2. Consideration be given by the Pollution Advisory Committee and the County Commission, toward possible legal action against Bordens for damage in Bishop's Harbor.

3. Any future degradation of water quality due to the discharge of industrial waste from the Borden plant result in litigation on the part of the County against the Borden Company to stop pollution of the waters of the State of Florida.


HILLSBOROUGH COUNTY
Borden Plant
Discharge Area
GULF OF MEXICO
SARASOTA COUNTY
SARASOTA COUNTY
GENERAL HIGHWAY MAP
MANATEE COUNTY
FLORIDA
MAY, 1943

Location Map


Bordon Plant
Drainage Ditch
Seepage Ditch
Cooling Pond
where seepage entered drainage Ditch
where drainage entered seepage Ditch
N
Gyp Pond
US Hwy 41
Buckeye Road

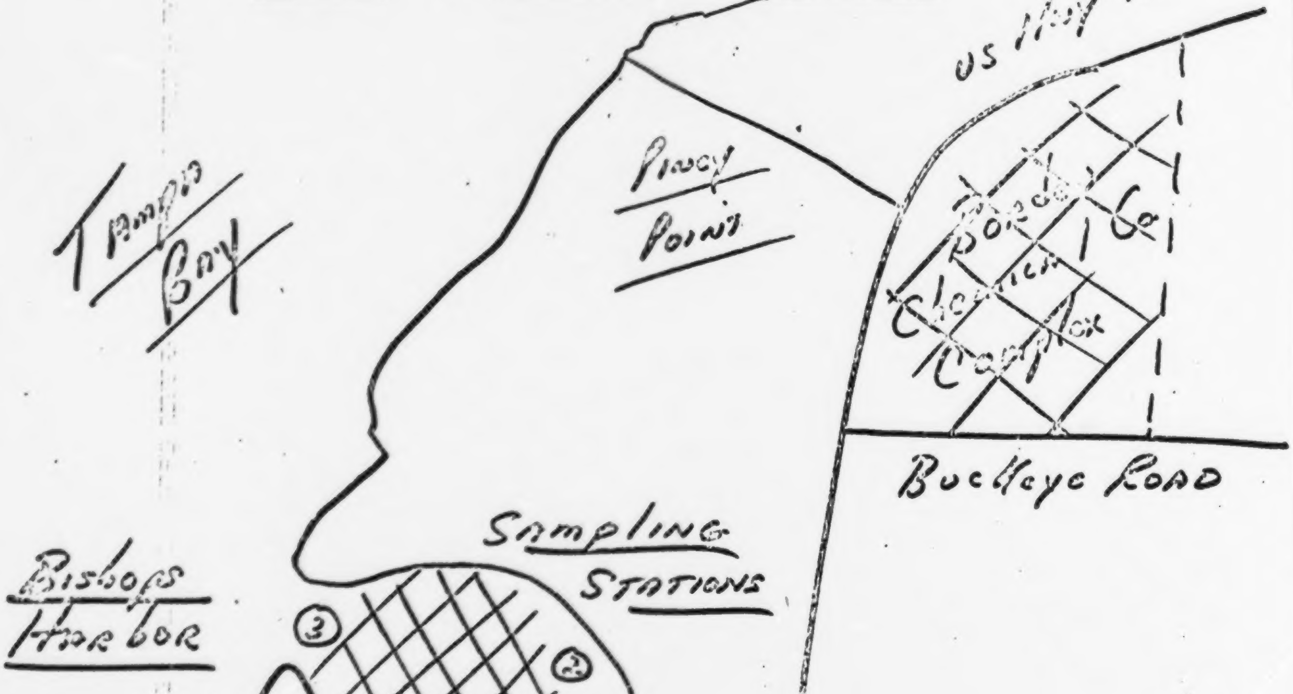
Station Number	Dates 1967	Tests Performed				
		pH (Lab.)	Acidity mg/l as $CaCo_3$	F^- mg/l	PO_4 mg/l	DO mg/l
A	8/10	2.95	451	8.5	2720	-
	8/11	2.62	1910	113.0	10,700	-
	8/14	3.40	389	68	1,940	3.5
	MAX.	3.40	1910	113	10,700	3.5
	MIN.	2.62	389	8.5	1,940	3.5
	AVG.	2.99	917	63.2	1328 ~~5,120~~	3.5
1	8/10	5.6	84	2.5	78	-
	8/11	6.11	39.8	28.1	57	-
	8/14	-	-	-	-	3.3
	MAX.	6.11	39.8	28.1	78	3.3
	MIN.	5.6	39.8	2.5	57	3.3
	AVG.	5.86	61.9	15.3	67	3.3
2	8/10	3.55	152	3.8	1,200	-
	8/11	4.75	136	44	1,150	-
	8/16	6.40	24.6	17.5	44	2.7
	MAX.	6.40	152	44	1,200	-
	MIN.	3.55	24.6	3.8	44	2.7
	AVG.	4.90	104	21.8	~~798~~ 93.	2.7

3	8/10	5.10	91.7	2.8	88	-
	8/11	2.98	740	112	460.0	-
	8/14	5.90	88.6	35	57.0	0.0
	MAX.	5.98	740	112	460.0	-
	MIN.	2.98	88.6	2.8	88	0.0
	AVG.	4.66	307	50	201. ~~1753~~	0.0
4	8/10	3.65	157	2.8	117.0	-
	8/11	3.10	716	115.0	452.0	-
	8/14	--	--	--	--	4.4
	8/16	6.70	14.6	12.6	26	0.0
	MAX.	6.70	716	115.0	452.0	4.4
	MIN.	3.10	14.6	2.8	26	0.0
	AVG.	4.48	296	43.0	198. ~~1905~~	2.2
5	8/10	6.4	23.8	2.6	33	-
	8/11	3.35	300.0	90.0	217.0	-
	8/16	5.85	67.0	19.2	90	1.5
	MAX.	6.40	300.0	90.0	217.0	-
	MIN.	3.35	23.8	2.6	33	-
	AVG.	5.20	130.0	37.0	113. ~~764~~	-

6	8/10	6.49	24.9	1.3	33.0	-
	8/11	3.39	252.0	46	1960	-
	MAX.	6.49	252.0	46	1960	-
	MIN.	3.39	24.9	1.3	33	-
	AVG.	4.94	138.0	24.0	115 ~~996~~	-
7	8/10	6.55	22.1	15.5	36	-
	8/11	6.45	28.2	23.0	36	-
	8/14	6.30	34.8	17.4	46	1.7
	8/16	5.70	72.0	20.0	100.0	2.0
	MAX.	6.55	72.0	23.0	100.0	2.0
	MIN.	5.70	22.1	15.5	36.0	1.7
	AVG.	6.25	39.3	19.0	54.0	1.8
8	8/10	6.70	20.4	16.0	58	-
	8/11	7.25	14.4	14.6	39	-
	8/14	-	-	-	-	1.8
	MAX.	7.25	20.4	16.0	58	-
	MIN.	6.70	14.4	14.6	39	-
	AVG.	6.98	17.4	15.3	48	-

9	8/10	8.49	0	3.4	4.3	-
	8/11	6.40	29.3	21.9	49.0~~.0~~	-
	8/16	6.20	39.0	20.0	60.0	6.5
	MAX.	8.49	39.0	21.9	49.0~~.0~~	-
	MIN.	6.20	0.0	3.4	4.3	-
	AVG.	7.03	22.8	15.1	37.8 ~~19.8~~	-
10	8/10	8.50	0	4.0	6.2	-
	8/11	6.58	20.0	15.0	32.3.0	-
	8/14	6.70	14.4	13.9	24.0	2.6
	8/16	7.45	11.2	5.7	14.2	4.7
	MAX.	8.50	20.0	15.0	32.3~~.0~~	4.7
	MIN.	6.58	0.0	4.0	6.2	2.6
	AVG.	7.31	11.4	9.6	19.2 ~~92.0~~	3.6
Borden's Ditch	8/10	2.10	6840.0	89.0	3830.0	-
	8/11	2.80	2130.0	450.0	1280.0	-
	8/14	2.40	2350	448	930.0	-
	8/16	-	1053	-	-	-
	MAX.	2.80	6840.0	450.0	3830.0	-
	MIN.	2.10	1053	89.0	930.0	-
	AVG.	2.43	3093	329.0	2013.3	-

Area Location Sketch


US Hwy 41
Piney Point
Tampa Bay
Borden Co
Chemical Complex
Buckeye Road
Sampling Stations
Bishops Harbor
③
②
①
US Hwy 41
N

Press release by the Borden Chemical Co.

August 11, 1967

A recent set of unfortunate circumstances has resulted in a quantity of water being discharged from The Borden Chemical Company Plant property to Bishop's Harbor without the proper chemical treatment. As soon as this problem was discovered, the Company immediately shut down all production. Although this shutdown is quite expensive in terms of lost production, we have had no hesitation in doing this. The Borden Chemical Company also immediately started repairing the points of trouble and under took extensive steps to neutralize any danger from the water.

The nature of the water that was exited to Bishop's Harbor was slightly acidic. Being slightly acidic, it could affect the vegetable growth in the storm drain system -- such as water hyacinths and cattails. By way of illustration, the acid value of the water is approximately the same as orange juice and slightly less than vinegar or lemon juice. It is expected that because of the terrific amount of dilution from rain water and the low acid value of this untreated water, that little or no effects will be observed when this water mixes with the salt water in Bishop's Harbor. Additional information which is pertinent would be the net effect of an 8" rainfall on 700 acres, which is approximately the area drained by the county storm drain system. This amount of rainfall on 700 acres would result in a run-off of 175 million gallons. With this amount of dilution, it is doubtful that marine life in Bishop's Harbor will be adversely affected.

We have been extensively studying the circumstances which may have occasioned this situation. It appears that the heavy rainfall experienced in the last few days was the basic cause: a) the heavy rainfall could not properly be carried off through the county drainage system because it was clogged with weeds and debris, b) as a result of this inadequate drainage, the surplus surface water overflowed into our seepage ditch surrounding our dikes causing an over-taxing of our circulation system, c) the heavy rainfall coupled with the increased load on the seepage ditches caused a small break in one of our dikes.

We are consulting with the County with regard to proper storm drainage. We are reviewing the capacity of our seepage ditches and thoroughly checking all of our dikes for any possible faults or weak spots.

Borden Co.

[illegible]
Aug 15, 1967

This release was prepared jointly by the Manatee County Engineering Department, the County Environmental Health Department and The Borden Chemical Company and given to the following listed newspapers:

The Bradenton Herald
Sarasota Herald-Tribune
Tampa Tribune
St. Petersburg Times

A cooperative study of the problems that created the recent incident in Bishop's Harbor by principals of the County Engineering Department, County Health and Pollution Control Department and The Borden Chemical Company has resulted in the following recommendations:

1. The storm drain system, which drains not only The Borden Chemical Company plant area but various farms in the area, should at all times be kept free of weeds and debris that may restrict this natural drainage into Bishop's Harbor.

2. The earthen dikes that separate this storm drain system from The Borden Chemical Company's recirculating captive system should be raised and seeded to prevent the possibility of further leakage or erosion.

3. The storm drain system should be realigned in its entirety along Buckeye Road exiting directly under Highway 41 into the County's storm drain system and not as present, meandering back through The Borden Chemical Company's property.

4. Various storm drain canals and ditches should be widened and deepened in order to carry the run-off.

5. Until after the hurricane season the water level in both the gypsum and cooling ponds will be kept at minimum operating level in order to accomodate more than normal rainfall.

It can be said that at this time all of the above recommendations are going to be put into effect through the cooperative efforts of The Borden Chemical Company and the County Engineering Department. This work is in progress at the present time and will continue as rapidly as possible until all the above recommendations are completed.

If further study and the results of any tests indicate that further action is needed, it can be depended upon that with the cooperation of the groups involved, a sound and safe solution will be found and put into effect.

CHEMICAL ANALYSIS

Station 5 Borden's Ditch	pH	Acidity	PO_4	F^-
5/24/66	8.3	0	0.6	0.90
5/31/66	8.2	8	0.4	0.75
6/6/66	8.1	6	0.75	0.80
6/13/66	8.3	0	0.17	0.90

Bishop's Harbor Samples

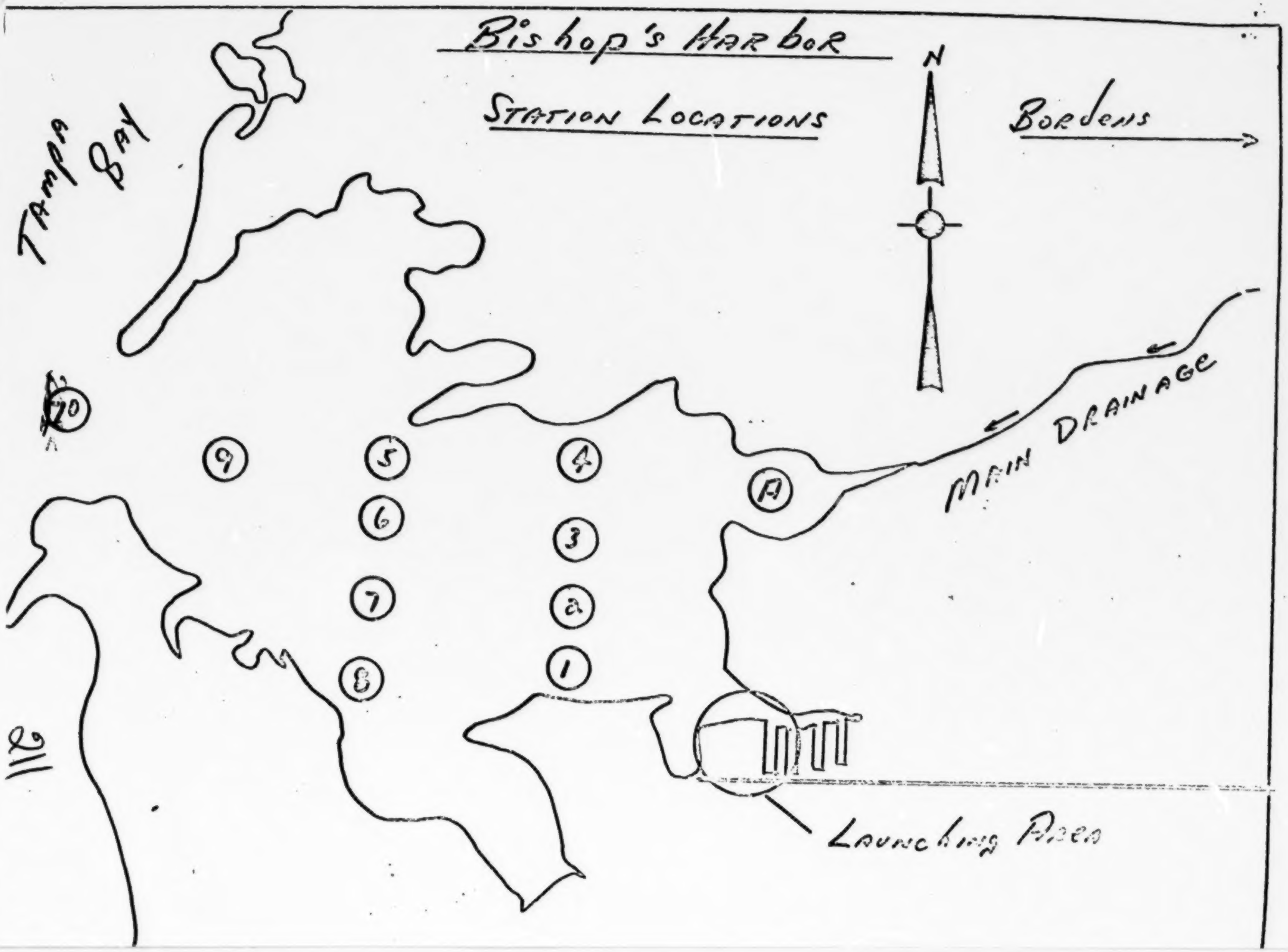
	DATE	Constituent pH	Fluorides	Phosphates	Chlorine
Stm. 1	2-15-67	7.2	3.0	28.4	14,800
Background	5-24-66	7.3	5.7	2.4	16,050
	5-31-66	7.7	6.2	2.0	16,300
	6-6-66	7.4	6.3	2.6	16,100
	6-13-66	8.0	5.6	1.9	14,300
Stm. 2	2-15-67	7.9	3.1	29.8	14,100
Background	5-24-66	7.5	5.7	1.9	22,400
	5-31-66	7.7	5.9	3.2	14,500
	6-6-66	7.5	6.8	2.8	16,800
	6-13-66	8.1	6.7	2.0	16,400
Stm 3	2-15-67	6.2	2.3	5.2	13,000
Background	5-24-66	8.1	5.6	2.2	23,600
	5-31-66	8.1	6.8	2.6	18,800
	6-6-66	8.0	7.2	2.4	16,000
	6-13-66	8.1	6.5	2.1	16,400

ADDENDUM TO THE
REPORT OF Aug. 21
1967

BISHOP'S HARBOR

Station	lab pH	Acidity	F$^-$	PO$_4$	DO	8/18/67	
1	7.2	15.5	8.8	24.4	3.4		
4	6.95	17.7	15.2	58	6.4		
5	7.7	8.8	9.0	57	3.3		
8	7.99	6.6	6.5	62	11.6		
9	8.30	0	4.3	16.6	8.5		
10	8.52	0	4.7	8.4	10.4		
Borden's Ditch	11.89	0	438.0	62	--		
						Total solids 8160	Susp. solids 6112
						8/21/67	
1	7.22	15.7	9.8	22.0	4.4		
4	7.12	18.6	14.2	42.0	8.8		
5	6.51	33.2	22.1	65.6	8.1		
8	7.8	6.7	7.4	18.4	6.4		
9	7.1	15.6	8.6	31.2	7.2		
10	7.75	9.1	8.5	20.0	6.9		
Borden's Ditch	2.80	2555	2310	1510	--		

Station Number	Dates 1967	Tests Performed pH (Lab.)	Acidity mg/l as $CaCo_3$	F^- mg/l	PO_4 mg/l	DO mg/l
A Entrance to Bishop's Harbor	8/10	2.95	451	8.5	2720	-
	8/11	2.62	1910	113.0	10,70.0	-
	8/14	3.40	389	68	1,94.0	3.5
	MAX.	3.40	1910	113	10,70.0	3.5
	MIN.	2.62	389	8.5	1,94.0	3.5
	AVG.	2.99	917	63.2	~~5,120~~ 1328	3.5
Borden's Ditch	8/10	2.10	6840.0	89.0	383.0	-
	8/11	2.80	2130.0	450.0	1280.0	-
	8/14	2.40	2350	448	930.0	-
	8/16	-	1053	-	-	-
	MAX.	2.80	6840.0	450.0	383.0	-
	MIN.	2.10	1053	89.0	930.0	-
	AVG.	**2.43**	**3093**	**329.0**	**2013.3**	**-**



Bishop's Harbor

Station Locations

N
Bordens
Tampa Bay
Main Drainage
Launching Area
1
2
3
4
5
6
7
8
9
10
A

SOUTHERN GULF UTILITIES, INC.

U.S. 441 AT N.W. 202nd STREET • MIAMI, FLA. 33169 • PHONE 624-9601

EXECUTIVE OFFICES

March 1, 1968

Mr. John R. Thoman
Regional Director
United States Department of the Interior
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

I am in receipt of your letter of February 23, 1968 with reference to Governor Claude R. Kirk, Jr.'s invitation to me to address the public meeting on estuarine resources.

I am singularly honored to have been so invited by the Governor but I regret that I must advise that pressing matters of business conflict to the extent that I will not be able to attend.

We would, however, like to go on record as stating that it has been the policy of Florida's government-owned water and sewer utilities to cooperate toward the elimination of pollutants in all of Florida's streams and estuaries. We consider it our responsibility to continue to do all that is reasonable and proper toward everyone's mutual goal of "clean water." To achieve these goals the public, our consumers, must be prepared to pay the costs of sophisticated treatment of waste water to eliminate pollutants and further regulartory agencies charged with the responsibility of fixing rates for service must be prepared to stand behind companies who are willing to spend necessary investment dollars to the end with a reasonable return on that investment is always available to our stockholders.

In summary, the problem of cleaning up our streams, rivers and canals is certainly the problem of governmental agencies, private investor-owned utilities, governmentally-owned utilities, industry and the public at large. I sincerely believe that the members of the Florida Water Works Association are more than willing to uphold their share.

Again, let me express my thanks for the invitation and my disappointment in not being able to accept.

Very truly yours,

SOUTHERN GULF UTILITIES, INC.

Howard C. Osterman

Howard C. Osterman

HCO/ah

SHANDS & BAKER, INC.
Sales Agent

SAND · GRAVEL
CRUSHED STONE

TELEPHONE 353-5551

POST OFFICE BOX 4667
JACKSONVILLE, FLORIDA 32201

March 6, 1968

Mr. John R. Thoman
Regional Director
U. S. Depart ment of the Interior
1421 Peachtree Street, N. E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

Last year, as the Committee Chairman for the Florida Council of 100, we drafted some bills which would put Florida well in the forefront on taking care of air and water pollution. We were successful in getting them through the legislature and now we have a setup here in Florida that I am sure can take care of the situation quite well.

I, frankly, think this is the spot that we shouldbe in and not be relying on the federal government except, naturally, to coordinate the situation where the states must operate together.

It so happens that the days of March 12 and 13 would be very difficult for me to present a paper to you but, obviously, it would be slanted along the lines of this letter and I don't imagine it would be the kind of reaction you (or Washington) would want.

Sincerely yours,

T S Baker

T. S. Baker
Vice Chairman of the Board

cc: Governor Claude R. Kirk, Jr. (w/encl.)

TSB:ds

Statement of Dr. F. A. Eidsness - Partner, Black, Crow & Eidsness,
Consulting Engineers, before Federal Water Pollution Control Administration,
Orlando, Florida - March 12, 1968

Black, Crow & Eidsness has for some time recognized and concurs with the objectives of The Clean Water Restoration Act of 1966.

Florida has literally thousands of miles of estuarine water frontage. This state, perhaps more than any other, obtains great benefits from these bodies of water for recreation, sport and commerce. Yet the pressures on these native estuaries for development, alteration or use as receiving areas for waste water effluents is increasing tremendously as Florida's new population seeks these desirable sites.

The role of the consultant in planning for waste water treatment and disposal is expanding. He is obliged to give increasing weight to the questions of the content of products of waste water treatment, location of the effluent outfall, and effect of effluent on the ecology of the receiving area.

Once in history it was considered sufficient for the engineered system to collect, treat, and discharge biologically "purified" waste waters into a nearby tidal body of water. Today--and increasingly tomorrow--the consultant is facing the challenging additional responsibility of studying the community environment. He must analyze the content of effluents produced by the various waste water treatment processes. He must consider the eco system of receiving waters, and effect of introducing varying types of effluents upon it. He must analyze alternate discharge possibilities against a yardstick made up of engineering, ecological, financial and community considerations.

This is a challenging engineering responsibility, but it is a satisfying one.

It should be helpful to cite several current examples. We are deeply involved in determining the ultimate type of waste water treatment and effluent disposal of a leading Gulf Coast resort city, which will preserve adjoining estuary waters and perhaps even add to the sum total of this communities' natural attraction. . This continuing program begins with elimination of septic tanks, providing adequate pumping and transmission facilities, and constructing treatment works of proven ability for minimizing organics and nutrients. Studies are being made on feasibility of ground water recharge of effluents. Basic study of this estuary is sorely needed, since pollution is not usually limited to domestic wastes alone but to agricultural uses of the watershed. The engineer is trained to recognize cost-benefit ratio, but the day has arrived in many communities where the people, speaking through their duly elected officials, may wish to determine "benefit" since they pay "cost".

Early in 1966 privately owned lands in a 2600 acre estuarine area located in Collier County in southwest Florida Gulf Coast, was acquired and vested in the national Audubon Society. Since that date additional properties have been purchased, the area now totaling 4000 acres. This area, separated from the Gulf by a narrow barrier island, is a mix of land and water, consisting of Rookery Bay, several small bays, numerous creeks, plus a substantial amount of adjoining mainland. The purpose of this acquisition was to preserve this area in its natural condition so it may continue to serve both conservation and recreation interests. As privately owned coastal lands in the vicinity are urbanized, Rookery Bay sancturary is intended to remain a meaningful sample of natural conditions which preceeded urban development, a publicly accessible marine park which provides pleasure to both its users as its viewers, a producer of and host to a variety of bird and fish life. The sancturary is not a self-contained ecologic unit and can be adversely affected by actions on nearby privately owned lands. Because of concern about wholesale conflict in this country between conservation and urbanization, the Conservation Foundation, with funds made available through a Ford Foundation grant, is sponsoring a program designed to develop ways and means of resolving the conflict and of building results of its efforts in the country's urban development process. We are privileged to be consulting engineers to the Conservation Foundation on this important program. We site this example since it represents a case in which private funds were obtained to acquire the land and private funds, through foundations, as sponsoring a study which should result in meaningful answer to the problem.

The continual problem of intrusion of salt water into Florida's fresh water supply is still evident. Although appropriate actions have been taken in many instances to establish salinity barriers, this problem is far from solved. We can site as one example salt water intrusion into the fresh water side of the Caloosahatchee River through lock operation at Olga dam. The river serves as raw water supply for both the city of Ft. Myers and the Lee

County Water System. Discussions are presently being conducted in order to eliminate, or at least miniumize, this particular problem. Construction of dams on many estuaries are required not only to prevent salt water intrusion into fresh water supplies, but for regulating discharge of fresh water which is needed to promote proper marine growth.

We believe that the program that you are conducting is extremely important, particularly to this State with its many miles of shoreline. It has been a privilege to bring these matters to your attention.

MOTE MARINE LABORATORY
9501 BLIND PASS ROAD/SARASOTA
FLORIDA 33581/(813) 924-1639

March 28, 1968

Mr. John R. Thoman, Regional Director
Federal Water Pollution Control Administration,
Southeast Region
Suite 300, 1421 Peachtree St. N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

The following is submitted with the request it be made part of the record of the meeting held at Orlando, Florida, March 12-13, 1968, at which Dr. Edward C. Raney represented the Mote Marine Laboratory.

An ecological study of Charlotte Harbor and adjacent bays was started in February 1968 with funds made available by the Mote Marine Laboratory. The area included in this study contains Lemon Bay on the north, Gasparilla Sound, Charlotte Harbor and Pine Island Sound, and extends from a point just south of Englewood, Florida to Ft. Myers, Florida. Inland the upper estuaries are marked by Port Charlotte and Punta Gorda. The water area is more than 200 square miles (130,000 acres).

The fresh water is supplied for this area by Myakka River and Peace River to the north, and near Ft. Myers from the Caloosahatchee River. The Intracoastal Waterway utilizes the estuary on the western edge.

Most of the Charlotte Harbor estuary is relatively unchanged. It is a shallow area and as yet receives relatively little pollution from cities. However, Port Charlotte and Punta Gorda are located on the Peace River and their population is expanding. Relatively few dredge and fill situations exist, although some trailer courts have recently been established on Pine Island. Gasparilla Island cannot be reached by road and sustains a moderate size population.

The general area is very well known for its sports fishery and mackerel, tarpon and other species are fishes regularly within the estuary and in the large pass (Boca Grande). At various times in the past pollution presumably due to phosphate mines has been reported for the Peace River. The Caloosahatchee River on the south is controlled by dams through the Corps of Engineers.

This estuary is of very great importance to the offshore fishery interests since most of the organisms which are utilized by the fishery in the Gulf spend at least part time of their life history in this estuary. The local fisheries for oysters and clams are significant.

The ecological study is using a laboratory site at Placida where excellent berths are available for the three boats which are being utilized. The largest is the RHINCODON (33 feet in length). Plans for a laboratory building located on a 30-acre tract have been made and a temporary laboratory is available. Also, the Mote Marine Laboratory owns Devilfish Key, a 27-acre island located in Gasparilla Sound.

Previously, little has been done on the ecology of Charlotte Harbor. However, the Mote Marine Laboratory, which was formerly named the Cape Haze Marine Laboratory, was established near Placida in 1955 by Dr. Eugenie Clark. The emphasis for the first five years was on the study of the behavior of local fishes, particularly sharks and rays.

The United States Bureau of Commercial Fisheries, St. Petersburg Beach, conducted a survey of the area in 1960 by collecting at 16 stations once a month for a year. These data have not been published but a short review was given in the "Report of the Bureau of Commercial Fisheries Biological Laboratory, St. Petersburg Beach, Florida, 1965." The Caloosahatchee estuary was studied by personnel of the Gulf Coast Research Laboratory, Ocean Springs, Mississippi. The results were published in Gulf Research Reports, Vol. II, No. 1, pages 1-71, under the title of "A Biological Investigation of the Caloosahatchee Estuary of Florida" by Gordon Gunter and Gordon E. Hall.

Our preliminary reconnaissance of Charlotte Harbor has been under the direction of Dr. Edward C. Raney, assisted by Dr. Chi-Sheng Johnson Wang, both of Cornell University. While major emphasis has centered on the fishes and larger invertebrates, the flora and physical parameters of the estuary have not been entirely ignored. By May 15, the initial phase of our reconnaissance will be completed and at that time the Mote Marine Laboratory will attempt to secure funds to substantially enlarge this study along lines suggested in the "Gulf of Mexico Estuarine Inventory." It is anticipated that this study will extend over a period of 10 years with bi-weekly visits to 20 stations for the purpose of collecting information on the biology, hydrology and sedimentology of the estuary at each station.

The Mote Marine Laboratory wishes to make this survey one of its major projects and is prepared to contribute substantially in the form of personnel, equipment, and vessel support to this program. It is hoped that Dr. Edward C. Raney will continue to direct this long-term ecological study which now enjoys the cooperation of three marine laboratories at St. Petersburg and Tampa as well as the wise counsel of several distinguished consultants.

Sincerely yours,

Perry Gilbert

Perry W. Gilbert
Executive Director

cc: Mr. E. T. Gensen

MOTE MARINE LABORATORY

The Mote Marine Laboratory is a non-profit institution devoted to basic research in the field of marine biology. It consists of two stations, one of which (formerly known as the Cape Haze Marine Laboratory) is located on Siesta Key in Sarasota and a second station located on 30 acres of waterfront property on the shores of Charlotte Harbor at Placida, some forty-five miles south of Sarasota. At present the main physical plant of the Laboratory is situated on Siesta Key on eight acres of land leased from the Palmer Estate. The Siesta Key Station provides research laboratory space for six visiting senior investigators and their graduate students and for five resident members of the scientific staff. The Charlotte Harbor Station at the present time consists of one temporary laboratory approximately 30 by 80 feet that serves as the headquarters for personnel engaged in a long-term ecological study of the Charlotte Harbor-Pine Island Sound Estuary. A two-story laboratory building that will accommodate twenty senior investigators and their graduate students is planned for this site and a contract will be let shortly for a dredge and fill operation which will provide a sheltered anchorage. Pictures of the two stations and a brief description of the properties are to be found in the appended brochure.

At the present time the Mote Marine Laboratory receives support from the Mote Scientific Foundation whose net worth is in excess of one half million dollars and there is no question but that this Foundation is fully devoted to supporting the Laboratory. In addition Mr. Mote has provided in his will that one million dollars from a trust fund administered by the Chemical New York Trust Company be set aside for the Mote Marine Laboratory. Additional funds for operational expenses are derived from individual bequests and membership contributions which totalled $105,000 for 1967. A grant of $30,500 from the National Science Foundation supports the operation of the Laboratory's research vessel RHINCODON for a two-year period beginning 1 September 1967.

Since assuming the directorship of the Laboratory 1 July 1967, one of the most gratifying and encouraging aspects of the Laboratory has been the vigorous program of research carried out by both visiting and resident scientists. Brief resumes of several of the research projects are to be found in the abstracts for the period July-December 1967, appended. For the next several years I visualize the research program of the Mote Marine Laboratory will develop as follows:

1. Approximately one third of our emphasis will relate to a long-term ecological study of the Charlotte Harbor Estuary. This large estuary

is one of the few such bodies of water remaining along the Gulf of Mexico or along the Atlantic Coast of the United States south of Cape Cod that is still in a relatively uncontaminated and natural condition. We have an unusual opportunity to study this body of water before man moves in and appreciably alters it. Once altered we then will have the opportunity of assessing the depredations of man on an estuarine environment. This study will be carried out in collaboration with several other institutions which will provide personnel as well as graduate student support. The project has the enthusiastic endorsement of the Bureau of Commercial Fisheries Laboratory and the Florida State Board of Conservation Marine Laboratory at St. Petersburg. A preliminary survey, under the direction of Dr. Edward C. Raney of Cornell University, is now in progress. The Charlotte Harbor-Pine Island Sound Estuary contains a variety of habitats, several of which serve as major nursery grounds for fishes and invertebrates that spend their adult lives on the Continental Shelf offshore.

2. A second portion of our research program will relate to long-term investigations carried out by senior staff members and their graduate student assistants who return to the Laboratory for substantial periods of time, or who work permanently at the Mote Marine Laboratory. These long-term programs include:

a) Marine Bioacoustics, directed by William N. Tavolga who is an outstanding leader in this field. Dr. Tavolga is currently spending a year's sabbatic leave from City College of New York at the Mote Marine Laboratory and is working actively with graduate and post-doctoral students on thresholds of hearing and vision in bony fishes and their mechanisms of sound production.

b) Biology of Elasmobranch Fishes, a program that capitalizes on the fact that extensive migrations of sharks, skates, and rays take place during each season of the year just offshore. Captain H. David Baldridge, United States Navy, is assigned to the Mote Marine Laboratory and is studying intensively problems relating to the thermodynamics of sharks. Dr. Johnson Wang is working at the Laboratory for seven months on the visual apparatus of sharks, skates, and rays. Dr. Eugenie Clark continues her investigations on the taxonomy and life history of local species of elasmobranchs. I am currently working, with my graduate students, on patterns of reproduction in elasmobranch fishes; the role of vision, olfaction, and the lateralis sense in directing a shark to food; and on problems relating to the jaw dynamics of representative sharks and rays. It is anticipated that these broad programs dealing with the biology of elasmobranch fishes will make the Mote Marine Laboratory the foremost center in the world for this type of study.

c) Biomedical Studies of Marine Vertebrates and Invertebrates, utilize local marine animals in a variety of physiological and pharmacological investigations. Current studies of Dr. E. Edward Evans, of the University of Alabama Medical School, on immunoglobulins in the blood serum of sharks and representative crustaceans form part of this program. Other studies dealing with the blood-brain barrier in sharks and the parasites of marine vertebrates will contribute to the biomedical program.

3. Approximately one third of the laboratory space and research emphasis is allocated to investigators who come to the Mote Marine Laboratory for short periods of time, from all parts of the world, to work on problems appropriate to the marine environment. Thus the Laboratory continues to enjoy a cosmopolitan flavor and provides space for a wide range of visiting investigators.

In the development of a laboratory such as this the importance of an affiliation with one or more first-class academic institutions is highly desirable. We are currently exploring the possibility of affiliating with one prominent educational institution in Northeastern United States and one in the Midwest. The "intellectual ruboff" that such institutions would provide to the Mote Marine Laboratory is obvious. In return the Mote Marine Laboratory could provide a much needed outlet for senior investigators and their graduate students at these and other inland institutions which have distinguished faculty members who work, or would like to work, with marine organisms. In addition, we are currently exploring the possibility of some type of affiliation with the Smithsonian Institution, representatives of which have already proffered valuable assistance and counsel in developing some of the programs of the Laboratory. In the future it is likely that other educational institutions will be invited to affiliate with the Mote Marine Laboratory, giving to this Laboratory ever greater intellectual promise and an opportunity to be of service in the training of a new generation of marine biologists and oceanographers.

The Mote Marine Laboratory has been mindful, in the development of its plans, of maintaining a good rapport with other institutions in the immediate area that are engaged in educational and research programs dealing with the marine environment. Cordial relations have been established with the U. S. Bureau of Commercial Fisheries Laboratory, the Florida State Board of Conservation Marine Laboratory, and the University of South Florida Marine Science Institute, all located in St. Petersburg. Visiting and resident members of the staff of our Laboratory give seminars regularly at these institutions. In addition graduate students from a number of southeastern academic institutions have visited the Mote Marine Laboratory and have received seminar-type instruction from resident staff members during the summer and fall of 1967. It is anticipated that this type of activity will increase as we enlarge our facilities and develop the Charlotte Harbor Station.

To recapitulate, I feel that the Laboratory has a bright future and its modest financial resources assure it some measure of stability. Its two stations, at Sarasota and Placida, are strategically situated at the edge of a broad Continental Shelf and on the shore of a large and unspoiled estuary. Moreover they are the only marine stations on the west coast of Florida between Tampa and Key West. The vigorous research and educational programs we envision for the Laboratory will develop as rapidly as funds from Federal granting agencies, private foundations, and individual bequests and membership contributions become available. The Mote Marine Laboratory at present possesses a small resident staff as well as a much larger group of visiting scientists eminently qualified to carry out the varied research programs in which they are currently engaged. Within a year affiliation with one or more outstanding universities will be effected and it is anticipated that the cordial relations already established with neighboring research and academic institutions will continue.

In short, I am convinced that the Mote Marine Laboratory, because of its unique location that provides ready access to a variety of estuarine and Continental Shelf habitats and to a rich semitropical and tropical fauna and flora, will continue to attract scholars of distinction and play a leading role in contributing to national and international oceanographic programs.

Perry W. Gilbert
Executive Director
Mote Marine Laboratory
and
Professor of Neurobiology and Behavior
Cornell University

Enclosures

Federation of Mobile Home Owners of Florida, Inc.

Mobile Home Owners' Blood Banks of Florida, Inc.

19 Tiffin Way,
Largo, Florida 33540
March 15, 1968.

Mr. John R. Thoman
Regional Director
United States Dept. of Interior
Federal Water Pollution Control Administration
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

The invitation to attend the Estuarine Pollution meeting in Orlando, Florida on March 12 and 13, 1968 was greatly appreciated by me as well as the Federation which I represent. I wish to submit the following statement for inclusion in the record.

The Federation of Mobile Home Owners of Florida, Inc., whose membership is composed of citizens of the State of Florida as well as many other States having access to estuaries, lakes, bays and other large bodies of water, can constructively add to the information to be included in the report. It is true we have no technical qualifications, but we feel it is essential to record the attitude and opinion of a large segment of the public such as represented in our Federation.

In order to minimize the size of an already voluminous amount of testimony, I will briefly enumerate the points which I feel essential.

1. State, county and local participation in correction and control of pollution of the nation's estuaries can be guaranteed by placing direct responsibility upon these three bodies. Federal authority should be limited to establishment of minimum standards with over-riding jurisdiction where local bodies cannot or will not meet these standards.

2. Federal government should, with cooperation of local governments, quickly establish a code of minimum standards to govern all levels of pollution control and elimination.

3. Federal government should finance and arrange for the gathering of all data developed by private industry, local governmental agencies, wild life interests, oceanographic societies, fishing industry and similar sources. It is apparent that some agencies have compiled excellent records over a period of years. This information would be available to all other governmental levels through printed matter or electronic equipment. Provision should be made for all pertinent data to be fed back to the Federal body to amend the record.

4. Arrangements should be made through some reliable organization such asthe U.S. Coast Guard and the Auxiliary to establish water testing stations and have members of the organizations mentioned make period tests, sending samples taken from such stations at the agreed levels. Temperatures could also be recorded at the surface and given depths. As an auxiliary member, I believe this additional service could be assumed without a great deal of trouble.

5. The suggestion that Sanitation, Water and Pollution Districts be established is most practical. The membership of such district should include representatives of all institutions within each district that may in any way be involved in producing or reducing elements that result in pollution or conditions that tend to adversely affect estuaries within that district. The code establishing minimum standards should provide for the establishment of the district or commission control plan and should endow the districts with reasonable authority to carry out the purposes and aims of the program. Provisions should be made to give the districts the power to prosecute and penalize violators of the program.

6. A strong and effective plan should be immediately agreed upon for a public relations and publicity program to be coordinated between Federal, State and local governments. The problem of pollution is in no way new. There is hardly a community of any reasonable size in the United States that has not been faced with this problem. Industrial and residential waste disposal has plagued innumerable areas. The rapidly expanding population is going to require the expansion of processing and manufacturing activities which will in turn increase the already menacing volume of pollution. If the public is made aware of the growing danger to life by reason of the pollution of our waters, I believe they will provide the necessary funds to successfully eliminate the present neglected areas of harmful pollution and to control the future spread. As has been stated, it is much easier and cheaper to prevent than to cure.

As a layman, I was tremendously impressed by the statements made at Orlando. It seemed to me that there is a vast amount of factual data already available but it is so scattered that its value is lost. As I listened to the speakers, I could not help but be reminded of our past mistakes in the misuse of other natural resourses, such as timber and coal. Fortunately, corrective steps were taken to conserve the remaining resourses and developement of better harvesting or mining methods.

Very sincerely,

John J. Johnston

AS MEMBERS OF THE GARDEN CLUB WE URGE THE FLORIDA AIR AND WATER POLLUTION CONTROL COMMISSION TO FOLLOW CLOSELY THEIR SCHEDULE OF ENFORCEMENT, I BELIEVE IT IS WORDED - QUOTE "AS EXPEDICIOUSLY AS POSSIBLE WITH COMPLETE COMPLIANCE BY 1973". IF THE COMMISSION FEARLESS ATTACKS THE MUNICIPAL AND INDUSTRIAL WASTE PROBLEMS, FLORIDA ESTUARIES WILL BE THE GREATEST BENEFACTORS. WE ARE TIRED OF THOSE INDUSTRIES THAT CLAIM THEY CAN'T AFFORD TO CLEAN UP. I SUGGEST THAT THEY HAD BETTER CLEAN UP, OR FLORIDA CANNOT AFFORD TO KEEP THEM REGARDLESS OF THEIR PAYROLLS.

I AM DELIGHTED AT THE APPROACH TO OUR PROBLEM. I THINK THAT FLORIDA HAS THE LAWS AND THE WILL TO SOLVE ITS OWN PROBLEM, WITHOUT BRINGING THE FEDERAL GOVERNMENT INTO PLAY. THERE ARE TOO MANY FEDERAL PROGRAMS. IF THE TRUSTEES OF THE INTERNAL IMPROVEMENT FUND AND THE FLORIDA AIR AND WATER POLLUTION CONTROL COMMISSION WILL EXERCISE THEIR RESPONSIBILITIES, FLORIDA WILL REMAIN IN OUR DISTINGUISHED GOVERNOR'S WORDS "NATURELAND".

THANK YOU FOR THE OPPORTUNITY TO GIVE THIS MESSAGE.

Sincerely yours,
Marleigh Bingham

P.O. Box 522
HOBE SOUND, Florida
33455

AS MEMBERS OF THE GARDEN CLUB WE URGE THE FLORIDA AIR AND WATER POLLUTION CONTROL COMMISSION TO FOLLOW CLOSELY THEIR SCHEDULE OF ENFORCEMENT, I BELIEVE IT IS WORDED - QUOTE "AS EXPEDICIOUSLY AS POSSIBLE WITH COMPLETE COMPLIANCE BY 1973". IF THE COMMISSION FEARLESS ATTACKS THE MUNICIPAL AND INDUSTRIAL WASTE PROBLEMS, FLORIDA ESTUARIES WILL BE THE GREATEST BENEFACTORS. WE ARE TIRED OF THOSE INDUSTRIES THAT CLAIM THEY CAN'T AFFORD TO CLEAN UP. I SUGGEST THAT THEY HAD BETTER CLEAN UP, OR FLORIDA CANNOT AFFORD TO KEEP THEM REGARDLESS OF THEIR PAYROLLS.

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THANK YOU FOR THE OPPORTUNITY TO GIVE THIS MESSAGE.

Sincerely yours,
Marleigh Bingham

P.O. Box 522
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PHILPOTT, ROSS & SAARINEN, INC.
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207 EAST BROWARD BOULEVARD
POST OFFICE BOX 1380
AREA CODE 305
PHONE 524-4661
FORT LAUDERDALE, FLORIDA 33302

STATEMENT FOR NATIONAL ESTUARINE POLLUTION STUDY

March 12-13, 1968
Park Plaza Hotel
Orlando, Florida

A. W. Saarinen, Jr., President
Philpott, Ross & Saarinen, Inc.

Much, if not most, of Florida's coast may under the broad language of Title II of Public Law 89-753 be considered an estuarine zone. Certainly our most popular beach resorts are in the estuarine zones. The Florida Development Commission reports that at least 70% of tourists to Florida are attracted to our state primarily by our beaches. The commercial use of our coastal waters for harvesting sea foods is well known. Our obligation to maintain an unimpeachable quality of our coastal waters is clear.

We possess the technology to perform the task. We have the financial resources to perform the task. Our greatest need often seems to be in the organization to perform the task most efficiently. Communities must find ways to cooperate without regard to political boundaries to solve the mutual problem in an effective and economical fashion. We believe that a solution found through communities working together is the proper way. We reject the idea of directly or indirectly inviting the Federal Government to solve these local problems. We applaud the Federal Government's role in encouraging the local governments toward solution, but the planning and execution of programs and projects must be directed by local governments.

AW Saarinen, Jr.

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March 11, 1968

Mr. John R. Thoman
Regional Director
U. S. Department of the Interior
Federal Water Pollution Control
Administration
Suite 300, 1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Dear Mr. Thoman:

I appreciate very much your invitation to make a statement at your National Estuarine Pollution Study Meeting, to be held in Orlando, Florida on March 12-13, 1968. This very important matter of cleaning up our coastal waters and rivers is of the utmost concern to the State of Florida because of its long coastline.

Since you ask for my statement to consider the role and relationship of federal, state and local agencies, it would seem to me that the logical approach would be for the Florida State Board of Health to administer the program in Florida, under the direction of the Federal Water Pollution Control Administration. As it is believed that the Florida State Board of Health would not have sufficient personnel and equipment to make a detailed study of pollution in the coastal waters of Florida, it should be empowered to hire competent Florida consulting engineering firms to make the studies and prepare reports on the various sections of our coastline. The Florida State Board of Health would then coordinate these studies with your administration. It is assumed that federal funds would be made available for the study.

Certainly the number one problem is to eliminate sewage that is now being dumped into our coastal estuaries, bays, rivers, and the like, and a considerable amount of study will have to be made to determine just how much work will be involved, and what the cost will be to eliminate this pollution.

Some of the cities have installed sewage treatment plants, which reduces the amount of pollution, but these plants are far from being adequate. Take for example the City of Miami, which for many years dumped its sewage into Biscayne Bay. Some 12 years ago a complete sewage treatment plant was put into operation, which handled the bulk of the sewage for said city; however, there are 27 other municipalities in the Miami area which have meager, if any, sewage treatment facilities. Therefore, the waters of Biscayne Bay, the Miami River, Little River, Snake Creek, and other tributary rivers continue to be polluted.

Naturally the most important consideration is that of health, but it must be realized that since Florida is a year-round tourist state, our coastal waters are used extensively for recreation purposes, such as swimming, boating, water skiing, fishing, and the like. These waters also provide breeding grounds and feeding areas for fish and other types of seafood.

We must not lose sight of the importance of these coastal waters in Florida for shipping. Some of the more important seaports of the United States are located on the Florida coast, and a method should be devised for keeping ships, yachts, and other craft from dumping waste materials into our inland waters. Oftentimes ships pump their bilges, and the bilge water brings with it oil and other objectionable materials, detrimental to most if not all of the uses to which we put these waters.

As more and more atomic power plants are built along our coastline, safeguards should be made to insure that there will be no atomic pollution, and that the thermal water discharged from such plants does not change adversely the uses for these coastal waters.

On behalf of my firm, Rader and Associates, Engineers and Architects, we offer to be of any service possible in the carrying out of this National Estuarine Pollution Study.

Yours very truly,

Earle M. Rader

Earle M. Rader
Consulting Engineer

EMR:RM

DUVAL COUNTY
COUNCIL OF **Camp Fire Girls, Inc.**
JACKSONVILLE, FLORIDA 32207
1428 LANDON AVENUE TELEPHONE: 359-2776

CAMP FIRE GIRLS

March 12, 1968

Director - Technical Programs
Southeast Water Laboratory
Federal Water Pollution Control Administration
Athens, Georgia 30601

Dear Sir:

Mail was piled high on my desk when I returned from a week's recuperation due to minor surgery, and the letter from Miss Ruth Ann Sanstedt, Camping Adviser - Camp Fire Girls, Inc., of National Headquarters, enclosing material telling of the meeting in Orlando, Florida, concerning estaurine problems, was among those I've been trying to catch up on.

I'm sorry we don't have a participant at that meeting; and I notice any statement we would like to make, should be addressed to you.

We would like to go on record as being vitally concerned with the preservation, as is humanly possible, of our estuaries, nationally, and more specifically those in the Mayport, St. Johns River, and Nassau River areas, locally. We understand that pollution and dredging unnecessarily, - changes the balance of marine life, destroys it, causing changes also in both the flora and fauna of the waters, where the rivers meet the sea. This we deplore.

Since we try to teach our youth to love the out-of-doors, and preserve whatever is natural and beautiful, what happens to our marine life is of prime importance. We have learned of a Youth Marine Study Center near Crystal River on the Gulf, and we would like to recommend your backing and support of a program like that in our community, and in other areas of the state. We have learned that several counties support that one, and perhaps we could do the same here, and throughout the state. We feel that the more the youth of today can be informed on these subjects - the greater is your potential for intelligent

DUVAL COUNTY
COUNCIL OF **Camp Fire Girls, Inc.**
JACKSONVILLE, FLORIDA 32207
1428 LANDON AVENUE TELEPHONE: 359-2776

March 12, 1968

and concerned citizens of the future to cope with the vast conservation and pollution problems.

If there are ways your studies uncover, that the Camp Fire Girls can help, if it's possible, we should like to do our part.

Sincerely,

Mary Dunlap

Mrs. Mary Dunlap
Executive Director

MD:ew

UNITED
A United Fund Agency

LIST OF REGISTRANTS
NEPS Public Meeting
Orlando, Florida
March 12 - 13, 1968

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Panama City, Florida

Mr. E. L. Addison
Gulf Power Company
P. O. Box 1151
Pensacola, Florida

Mr. Bjarne B. Andersen, Jr.
Assistant Attorney General
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Tallahassee, Florida

Mr. Thomas B. Ard
City of Jacksonville
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Mr. David Backmeyer
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Department of Water & Sewers
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Florida Wildlife Federation
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Palm Beach, Florida

Mr. W. L. Barnes
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Mr. William M. Beck, Jr.
Florida State Board of Health
Jacksonville, Florida

Mr. Craig T. Bell
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Florida Forestry Association
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Mr. Sidney A. Berkowitz, Dir.
Bureau of Sanitary Engineering
Florida State Board of Health
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Honorable John W. Bonsey
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Mr. Alex S. Chamberlain, Jr.
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  Planning Council
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Mr. Hoyt Charles
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Florida Municipal Utilities Assn.
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Mr. S. S. Gaillard, Director
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Tallahassee, Florida

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Orlando Utilities Comm.
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P. O. Box 549
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U. S. Atomic Energy Comm.
P. O. Box A
Aiken, South Carolina

Dr. R. W. Harrington
Florida State Board of Health
P. O. Box 308
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